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BIOLOGICAL TESTING OF MILK FOR TUBERCULOSIS AND BRUCELLOSIS

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In order to supplement the meagre information at present available regarding contamination of our South African milk supplies with tubercle and brucella bacteria, this article records the results of routine biological testing of milk done by the Johannesburg Municipal Veterinary Department during the period 1947-1949.*

Methods. In the campaign against the marketing of tuberculous milk, particular attention is directed to producers supplying milk which is sold to consumers in the raw state, and the supplies of these dairymen are all tested as frequently and as regularly as possible. From a public health viewpoint, the need for testing milk consigned to pasteurizing depots is less urgent, and for this reason testing is performed less systematically.

Milk samples are either collected at the receiving depot or shop, or else on the dairy farm itself. In the first case, sampling is done, wherever possible, by using a sterile milk pipette to withdraw a small amount of milk from each can of the series of freshly opened milk cans received from a producer. These portions of milk are bulked and thoroughly mixed, and a sample of this mixed milk is decanted into a 4-oz. bottle for delivery to the laboratory. Unfortunately, due to a variety of causes, it often happens that only part of the complete herd milk may be available for sampling at the depot or shop.

Additional samples are also collected at the dairy farms by the veterinarians performing routine dairy herd inspections, who use the method described above to collect samples at the conclusion of milking operations. This method of sampling has the advantage of affording a truly representative sample containing a portion of milk from every cow in the herd. As may be expected, both pasteurised and raw milk shop supplies are represented by this type of sample.

* Several veterinarians have been engaged in carrying out the tests and collecting samples and thanks are due to them, and to the Director of the Municipal Abattoir and Livestock Market Department, Johannesburg, for permission to publish the data. During 1947 and 1948 Dr. I. Mowat and the author were employed on routine milk control, and more recently Dr. R. K. Loveday, Dr. A. A. L. Albertyn and the author have been carrying out milk control duties. The information given represents the combined findings of all these workers and may be regarded as a continuation of the routine Johannesburg dairy control work previously reported by Pullinger (1942).

In the laboratory, the material to be utilized for biological test is derived by centrifuging 30 ml. of milk from each sample at 3,000 revolutions per minute for at least 30 minutes. After discarding the supernatant fluid the milk sediment is mixed with 1 ml. of sterile water and is injected into the medial aspect of the thigh of one guinea-pig. Four weeks later the guinea-pig is killed by an atlanto-occipital blow and an autopsy is performed. Smears are always made from suspected tubercular lesions and stained by the Ziehl-Nielsen method for microscopical confirmation of the diagnosis, whilst in doubtful cases, subinoculation is performed for further investigation.

TUBERCULOSIS

Results are detailed in Table 1 for a series of 1,174 milk samples, representative of 722 different dairy herds, of which 12 samples were found to be contaminated with tubercle bacilli. Thus, in terms of total samples tested, 1% of milk samples were tuberculous. However, in terms of the different individual herds tested 1.7% of these herds gave tubercle-contaminated milk.

TABLE 1: HERD MILK SAMPLES EXAMINED BIOLOGICALLY FOR TUBERCULOSIS

Class of Trade	Origin of Samples	Number of Samples	Tubercle Bacilli		Per cent. Samples Contaminated with Tubercle Bacilli	
			Present	Absent		
Raw milk trade	Raw milk shops	728	5	723	0.69	
	Milking sheds	83	6	77	7.23	
	Total	811	11	800	1.36	
Pasteurized milk trade	Pasteurizing depots	353	0	353	0	
	Milking sheds	10	1	9	—	
	Total	363	1	362	0.28	
Total	1,174	12	1,162	1.02

These figures indicate that the degree of contamination of milk entering Johannesburg is considerably less than that recorded for the large towns in Britain, where an average of about 8% of herd milk samples examined between 1928-1937 contained tubercle bacilli (Wilson, 1943). It is also less than the figure reported by Horwitz (1944), who found 3.5% of tubercle contamination in the Cape Peninsula, and less than the incidence of 2.5% recorded by Pullinger (1942) in respect of the Johannesburg milk supply. It confirms Pullinger's opinion that the incidence of tubercular mastitis is comparatively low amongst highveld dairy cows although tuberculosis is believed to be prevalent within the dairy herds.

This figure of 1% is, however, mainly built up from the relatively large number of positive milk shed samples collected by veterinarians on the farms (i.e. 7.2%), and it would seem that this type of sample is much more likely to reveal tubercular contamination than samples collected at the milk shops. This feature is partly explained by the fact that tuberculous carcasses detected during meat inspection in the abattoir are traced back to the herd of origin by the veterinarians engaged on dairy herd inspection. Whenever grossly infected cattle or pigs are found on the slaughter floor, originating from dairymen supplying the city, the veterinarians take immediate steps to obtain a specimen of herd milk from the milking shed for biological test, so that a number of the milk shed samples are collected from herds already known to be tuberculous and must be classed as selected and not random samples. By this means tubercle bacilli were detected in the milk from three herds, which, in the normal course of events, might not have been tested for a considerable period. However, even if these three herds are not included amongst the positive milk shed samples tabulated in Table 1, the discrepancy is still so marked that there would seem to be other factors responsible for the difference. It is believed that another explanation is the fact that a milk shed sample contains a portion of milk from every cow and therefore constitutes a genuine herd sample, whereas, when a specimen is collected at a shop or depot, only a portion of the herd milk may be available for sampling. Either it happens that portion of the herd milk may already have passed over the cooler by the time sampling is carried out, or else that particular shop or depot may only be one of several to which the producer consigns his milk.

In two instances milk shop samples were collected and tested and shortly afterwards the same herds were re-tested using milk shed samples. In both cases the shop samples were negative whilst those from the milk shed yielded positive results, which were subsequently confirmed by identification of the responsible infected udders in both herds. Considered in conjunction with a preponderance of positive results in milk shed samples, this is a disturbing feature from the public health viewpoint, and serves to indicate the necessity for obtaining genuine herd samples when examining milk for tubercle contamination.

Further analysis of the data in Table 1 reveals the strange feature that no tuberculosis was detected amongst those samples collected at pasteurising depots, whereas 1.4% of samples derived from herds supplying

the raw milk trade were contaminated with tubercle bacilli. The only apparent distinction between dairy herds supplying pasteurising depots and those supplying raw milk shops is that the former tend to be more distantly situated. In general, the milk consigned to raw milk shops is derived from nearby herds, say within a fifty mile radius of the city, whereas the outlying herds up to a maximum radius of roughly 150 miles tend to serve the pasteurising depots. This distribution is by no means absolute and it will readily be appreciated that numerous exceptions occur.

Unlike the nearby milk supplies which, on centrifugation, furnish a creamy sediment easily miscible with water to form a smooth emulsion for injection and devoid of residue, samples of the long distance milk supplies are often handled in stages of incipient souring. Centrifuging this type of milk produces a brittle sediment which does not emulsify but breaks into fine clots so that only portion of the sediment can be coaxed into a syringe. The possibility cannot be excluded that falsely negative results may occur due to incomplete injection of milk sediment on this account.

TABLE 2: SITUATION OF TUBERCLE-CONTAMINATED HERDS DETECTED BY BIOLOGICAL TEST

<i>Herd No.</i>	<i>Situation</i>	<i>Miles from City</i>	<i>Years Established (Approximately)</i>	<i>Tubercular Animals found in Previous Years?</i>	
1.	Klipriviersberg	4	Small holding in built-up area	30	Yes
2.	Bedford View	5	do.	15	No.
3.	Willowdene	9	Pastoral herd	30	Yes.
4.	Kliprivier	19	do.	30	Yes
5.	Klipriver	19	do.	6	No
6.	Grasmere	25	do.	25	Yes
7.	Grasmere	25	do.	25	Yes
8.	Wilgespruit	25	do.	25	No
9.	Daleside	25	do.	20	No.
10.	Daleside	29	do.	8	Yes
11.	Bethal	110	do.	15	No.
12.	Kliprivier	20	do.	20	Yes

In order to facilitate comparison, the approximate situation of the herds giving tubercle-contaminated milk is classified in Table 2. Reference to this table shows that 10 out of 12 of the tubercle-contaminated samples were derived from herds situated within a 30-mile radius of Johannesburg, but only two of these herds were living on small built-up properties. The remaining ten herds enjoyed an open pastoral existence so that apparently, the comparison is not between cows living under 'urban' and 'rural' conditions. Rather, it seems that the fact that the tubercle contamination in most cases was found in long established, largely self-contained herds, is of significance. It is believed that these conditions assist in propagating the disease, which is eventually manifested as a tubercular mastitis in one or more dairy cows. The fact that more than half of these herds have a previous history of tuberculosis during the period they have been in existence is significant.

Table 3 shows the incidence of tubercular infection in samples obtained from individual cows with udders clinically suggestive of tuberculosis. It is seen that only three out of sixteen milk samples contained tubercle bacilli (i.e. 19%), as compared with 5% found by Pullinger (1942) for a much larger series of samples. Mention should be made of the fact that, owing to the high incidence of mastitis in dairy herds, a monotonously large percentage of diseased, deformed and indurated udders are encountered during herd inspection. This factor does not facilitate the task of detecting tuberculous udders and it is only when pressing reasons exist for suspecting tuberculosis, that udder samples are collected for biological test.

Investigation was also carried out in respect of 25 glandular abscesses (parotid, submaxillary, pharyngeal), encountered during routine herd inspection, of which 10 were shown to be due to infection with *M. tuberculosis*. In six instances the diagnosis could not be established by microscopical examination of the pus and the cause was only determined on completion of the biological test.

TABLE 3: EXAMINATION OF SAMPLES FROM COWS SUSPECTED OF SUFFERING FROM TUBERCULOSIS

Nature of Sample	No. of Cows Examined	Cause of Diseased Condition		Percentage of Tuberculosis
		Tuberculosis	Other Causes	
Milk from suspicious udders	16	3	13	19.0
Pus from glandular abscesses	25	10	15	40.0

BRUCELLOSIS

By means of the Ring Test van Drimmelen (1948) showed that well over 50% of milk supplies contain *Brucella* antibodies, and Lewin, Bersohn and Richardson (1948) found *Brucella* agglutinins in 70% of milk samples submitted to whey agglutination tests. These surveys indicate that contagious abortion is widespread throughout South African dairy herds, and there is a need for more knowledge regarding the degree of contamination of our milk supply with *Brucella abortus* organisms. The opportunity has therefore been taken to utilise guinea-pigs undergoing biological tests for tubercle contamination, to supplement existing information.

The method of investigation used was by agglutination test of guinea-pig blood removed by heart puncture during autopsy. The serum was subjected to agglutination test, in dilutions from 1 : 10 to 1 : 160, using an antigen suspension of *Brucella abortus* obtained from Onderstepoort laboratory, prepared to correspond in density to Brown's opacity tube No. 4. The results are presented in Table 4.

Altogether, 217 milk samples were tested of which 35 samples were positive for Brucellosis, i.e. 16.1%. Although this figure approximates the finding by Pullinger (1948) that four out of thirty-eight herd samples, or 10%, contained *Brucella abortus*, it greatly

TABLE 4: AGGLUTINATION TITRES OF GUINEA-PIG SERUM

Dilution of Serum	Number of Specimens showing Agglutination
1:10	1
1:20	1
1:40	3
1:80	13
1:160	17
Total	35

exceeds the estimate of Lewin *et al.* (1948), who obtained only three positive results in a series of 92 samples examined by guinea-pig inoculation.

This disagreement is not easy to explain. Perhaps certain factors which render the biological test an unreliable method for identifying *Brucella* organisms in milk (Pullinger, 1948), may be partly responsible. It cannot be denied too, that differences in the technique of the agglutination test may have contributed towards the discrepancies. This serves to emphasise the importance of the recent resolution that 'in view of the seriousness of brucellosis as an economic and public health problem . . . diagnostic tests and methods be standardized in each country, and that an international standard for the agglutination test be agreed' (14th International Veterinary Congress, 1949).

The fact remains that sufficient evidence is available to indicate that a not inconsiderable portion of the milk supply contains *Brucella abortus* organisms, and unfortunately there is little hope that steps will be taken in the near future to control the disease in cattle (Ed., J.S.A. Vet. Med. Assoc., 1948). In these circumstances, *Brucella* contamination of the milk supply must continue to have significance from the viewpoint of public health.

SUMMARY

1. A total of 1,174 herd milk samples were submitted to biological test of which 1.02% were found to be contaminated with tubercle bacilli.
2. Of 217 samples of milk biologically tested for *Brucella abortus* organisms, 16.1% yielded a positive result.

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EDITORIAL

THE SERODIAGNOSIS OF SYPHILIS: ITS STANDARDIZATION

The need to standardize laboratory procedures for the diagnosis of syphilis has become recognized all over the world.

The 1939 international conference, planned to take place in Copenhagen, was cancelled because of the outbreak of war and the World Health Organization has taken an early opportunity to convene another international conference in 1951 or 1952. The planning of this conference is well under way and should do much to achieve a greater and very desirable uniformity in the performance of serological tests.

Earlier international conferences were held under the auspices of the League of Nations in 1923 and 1928 (Copenhagen) and in 1930 (Montevideo). The United States Public Health Service also convened a congress in 1931 and venereologists will be interested to hear that Dr. P. Krag, formerly Assistant Director of the State Serum Institute in Copenhagen, has accepted the assignment with WHO to direct the next conference.

There are several cogent reasons for the coming convention:—

1. In all parts of the world a great variety of sero-diagnostic test methods is used although they are known to give divergent results.

2. New tests have been described which could obviously not have been evaluated at previous international conferences.

3. It is important to assess the development of purified cardiolipinlecithin antigens (Pangborn); and the discovery of the *Treponema immobilization* reaction (Nelson).

4. There is a general need to determine the most practical method for mass serological examinations.

The personnel of the participants of the next congress will be carefully selected on the basis of advice given by the Sub-Committee on Serology and Laboratory Aspects. Scientific, geographical and other factors will be taken into account. Only an author-serologist, or a serologist designated by him, will be allowed to perform the author's procedure during the conference. Each author-serologist can enter several procedures, but only one may be accepted.

We can have every expectation that, as the result of this authoritative conference on laboratory methods, serologists will be in a position to make an even more reliable contribution to the diagnosis of syphilis than has been possible until now.

VAN DIE REDAKSIE

DIE SERO-DIAGNOSTIEK VAN SIFILIS: DIE STANDAARDISERING DAARVAN

Die behoefte om laboratoriummetodes vir die diagnose van sifilis te standaardiseer word nou oor die hele wêreld erken.

Die internasionale konferensie van 1939 wat in Kopenhagen gehou sou word, is weens die uitbreek van die oorlog gekanselleer en die Wêreldgesondheids-organisasie het 'n vroeë geleentheid te baat geneem om 'n ander internasionale konferensie in 1951 of 1952 te belê. Die voorbereidings vir hierdie konferensie het reeds ver gevorder en dit behoort veel daartoe by te dra om groter en uiters wenslike uniformiteit by die uitvoer van serologiese toetse daar te stel.

Vroeër internasionale konferensies is in 1923 en 1928 (Kopenhagen) en in 1930 (Montevideo) onder beskerming van die Volkebond gehou. Die *Public Health Service* van die Verenigde State het ook in 1931 'n kongres belê en geslagsiektkundiges sal met belangstelling verneem dat dr. P. Krag, voorheen Assistent-direkteur van die Staat-seruminstituut te Kopenhagen die taak by WHO aanvaar het om as direkteur van die volgende konferensie op te tree.

Daar is verskeie oortuigende redes vir die aanstaande konvensie:—

1. In alle dele van die wêreld word 'n groot verskeidenheid toetsmetodes vir serumdiagnosering gevolg alhoewel dit bekend is dat hulle verskillende resultate lewer.

2. Beskrywings is gegee van nuwe toetse waarvan die waarde uit die aard van die saak nie op vorige internasionale konferensies bepaal kon word nie.

3. Dit is belangrik dat die ontwikkeling van die gesuiwerde antigeen van kardioliipienlesities (Pangborn) en die ontdekking van die immobiliseringsreaksie van *Treponema* (Nelson) na waarde geskat word.

4. Daar bestaan 'n algemene behoefte om die mees praktiese metode vir serologiese massa-ondersoeke te bepaal.

Die personeel van die deelnemers aan die volgende kongres sal sorgvuldig gekies word op grondslag van advies deur die Sub-komitee oor Serumkunde en Laboratorium-aspekte gegee. Wetenskaplike, geografiese en ander faktore sal in aanmerking geneem word. Slegs 'n ontwerper-serumkundige of 'n serumkundige wat deur hom aangewys is, sal veroorloof word om gedurende die konferensie die ontwerper se metode te demonstreer. Elke ontwerper-serumkundige kan verskeie metodes inskryf, maar slegs een kan aanvaar word.

Ons koester alle hoop dat as gevolg van hierdie gesaghebbende konferensie oor laboratoriummetodes, serumkundiges in staat sal wees om 'n selfs betroubaarder bydrae tot die diagnose van sifilis te lewer as wat tot dusver die geval was.

PROCEDURES IN THE CONTROL OF TUBERCULOSIS

THE PRACTICAL APPROACH: 3. THE ROLE OF THE SETTLEMENT IN TUBERCULOSIS CONTROL

PAUL SYKES

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While taking full cognizance of the advances achieved by modern medicine in the tuberculosis field and the experience gained socio-economically in its control, the problem in Africa has its own specific points. The practical application of knowledge gained elsewhere will, in many instances, have to be modified to meet these needs, in others developed and in still others new techniques may be evolved.

The following points briefly illustrate this:

I. *Specialized African Considerations.* 1. *The Human Material.* Making for difficulty are the following:

(a) The illiteracy of the people generally.
(b) Superstitious beliefs which make for an entirely different conception of the nature of disease and the practice of Medicine.

(c) An elementary hygiene which breaks down completely under the stress of a cash economy.

Making for helpfulness are:

(a) His biddability and faith in the administrators and missionaries he knows.

(b) His deep sense of brotherhood and clan and family responsibility.

(c) His eagerness to learn, and his adaptability.

There is also the rapid course the disease takes in the Native which might be either an advantage or a disadvantage. In many instances it gives an alarmingly high death rate, but it does mean that the source of infection does not remain long active in the community.

(2) *The Terrain.* On the whole, in Africa we are dealing with huge agglomerations of people, though in many instances we are dealing with the after effects of such agglomerations due to the migrant labour system. The disease is therefore continually being spread over vast areas, many of them inaccessible to modern transport.

There are debilitating endemic diseases which predispose to a deficiency disease such as tuberculosis. There are the periodic food shortages making for malnutrition.

(3) *Social Condition.* Elementary environmental services, water, sewerage and drainage are completely lacking. The type of house structure makes of overcrowding a normal condition. The fear of the outside world, both spiritual and physical, making for a minimum amount of fresh air—all the maladjustments of a changing social order; the wearing of unsuitable types of clothing and unsuitable quantities of clothing, failing to change clothes when damp; the physical stress due to unwonted conditions of sustained labour; the emotional strain due to labour centres not providing for normal family life and the rural areas being denuded of their able-bodied male population.

II. *Isolation: Hospital vs. Settlement.* The most

elementary need and the starting point for any effective control is isolation of the known case. One at once says 'hospital'. If we examine this solution we shall find serious African objections. Our Western conception of hospital is not acceptable to the African except where there is no alternative. The enforced separation from his home and his familiar environment make him extremely reluctant to enter strange surroundings with the result that disease is too far advanced. Death contaminates the place in a perfectly terrifying manner. He is denied all that he knows might help. The battle is therefore lost medically and psychologically before he enters. The hospital is a house of disease. Death is its permanent inmate. The question then arises, if it is so wrong psychologically, why do the governing powers spend so much money on them, because, where the problem is of such magnitude, we cannot possibly afford to deal with it on the basis of an expensive traditional hospital bed.

There is the further point—why these costly permanent structures if we are seriously determined to tackle this problem? We certainly have the knowledge to reduce its size to disappearing point. Then the hospital and its beds are a disappearing and not a growing need.

This is speaking generally; there is now and there will be for many years to come an urgent need for fully equipped and staffed tuberculosis hospitals but they are not the answer to the isolation problem.

Though the trend in the Union towards austerity types of bed has been a forced measure due to financial stringency, it is a step, so far as tuberculosis is concerned, in the right direction.

III. *Settlement as Partial Solution.* It is therefore to the colony or settlement idea that we must look for, at any rate, a partial solution. We shall find that some of the objections to hospital also apply to the settlement, but there are many points favouring the settlement.

Mass compulsory isolation camps are an answer but could never be carried out except under police guard. There would be few to advocate so drastic and unintelligent an approach. It would drive disease underground and in the antagonism roused would frustrate its own ends.

The 'settlement by persuasion' concept is possible with two provisos:—

i. That opinion be softened up by intensive propaganda. In this way the intelligent individual could be brought to co-operation and informed public opinion would be too strong for the unintelligent.

ii. The word 'settlement' should mean hope for the individual, the family and the community and the

type of life should be attractively healthy and satisfyingly active. There are visions, if the idea is put across really sympathetically, of rehabilitation of the health of the family going in hand with reclamation of the soil, so that there should be built up all over Africa groups of healthy, vigorous people who, though stemming originally from diseased groups, would, under the controlled conditions of a settlement emerge as the happiest groups in the community.

IV. Settlement Functions. If we get away from the accepted idea of the settlement as being solely rehabilitative we shall find many other functions which it could perform.

1. *Isolation.* Mass isolation could take place. All the familial contacts of a sufferer are at risk. Therefore, for their own and the community's sake it is necessary for them to be treated as a group and to live under controlled conditions. It should be easier to get the active sufferer there and keep him there if his family also goes with him. Some security would have to be offered to the group, in the form of land tenure and grazing for stock. Education would have to be available for the children.

2. This brings us to *care of the family as a whole*. There is no reason why this should be more expensive than the maintenance costs for the sufferer in hospital plus the child welfare and family maintenance grants for the contact family. In fact the nursing, cooking, cleaning and sewing for the sick could be done by members of the families. So also could vegetables and fruit production, poultry, cattle and pig farming.

3. *Rehabilitation.* Small industries could be carried out suitable for tuberculous persons and providing reasonable remuneration. They should provide practice for aptitudes and skills already being carried out in the locality as well as for suitable new ones.

Added Functions: i. Certain categories of patient which have always been regarded as hospital cases could be offloaded on to the settlement.

ii. The time it is essential for a case to be in a hospital bed is a very small part in the life of a patient from diagnosis to arrest. So the major part of the life of treatable tuberculosis cases can be transferred to the settlement.

We are now reaching the point where the settlement begins, with its traditional and other functions, to fill the horizon to such an extent as to assume a major position in an African tuberculosis control programme. This would necessitate, at present, concentration on conservative treatment. The settlement would be an isolation, preventive, conservative treatment and rehabilitative centre. There would have to be many of them. Where possible they should be grouped round central tuberculosis hospitals, otherwise the expert services could be carried out by a travelling team with mobile X-ray and other therapeutic and diagnostic, propaganda and research aids and equipment.

V. The Need. There is no doubt that, with the exception of a few favoured areas, tuberculosis is a growing menace to health, to primary production, to development, particularly of industry, from Egypt to the Cape Province and from Zanzibar to the Gold Coast.

Even if it was desirable, we should not in many cases

catch up on the shortage of hospital beds and the cost would be prohibitive. Public Health demands isolation. People do not like isolation. The fear of isolation can be partly overcome, if the whole family group is dealt with.

VI. Types of Settlement. There would have to be two types.

i. The peri-urban type for workers in towns and their families where detribalization had taken place and where life, economically, would revolve round urban type of industries.

ii. The rural type with very simple buildings of the same construction as pertaining in the area. Market gardening and other food production together with such industries as brush-making, pottery, weaving, bead-work, mat-making, etc., according to the availability of raw materials in the locality.

VII. Siting. The first essential in choosing sites must not be climatic, but their accessibility to the people they are intended to serve. It must be in their midst. Out of sight is out of mind. It is bad for society, and for this reason and others a settlement of 500 persons should be the figure aimed at. This would necessitate a network. With negligible construction costs this would be possible and as the need waxed or waned so new sites could be chosen and old ones abandoned.

The next is, of course, the availability of medical skill and the equipment through which it can function. As suggested, this would be either a fully-staffed and equipped tuberculosis hospital or a first-class travelling unit.

It is not necessary to go into such elementary matters as access to water, building materials, facing away from sun and weather, etc.

VIII. Building. This should be of the simplest type, allowing for the maximum amount of fresh air and utilizing the materials and building methods employed in the area. Life will be out-of-doors most of the day. Patrolling night-watchmen can solve the fear of sleeping on the verandah and having doors and windows always wide open.

IX. Finance: Capital. Compared with the usual budgetary provision for meeting capital health needs, the amount required for this health service should be reasonable and within the means of the country to supply, so long as the great majority of the 'places' are settlement places.

It is possible to quote costs from an already established peri-urban settlement. The beds there work out at about £53 per bed. The construction being hollow cement blocks, damp ant-proof courses, thatched roof, doors and windows. This cost could be reduced considerably in rural type settlements. In Southern Rhodesia the cost per 4-bed unit would be about £70 and in parts of Central Africa the per bed cost could be reduced to as little as £3 10s. On the same settlement children's hospital beds built in cavity wall common brick, concrete floors, tiled wash block, septic tank sewerage, large kitchens, dining, recreation and office rooms and nurses' home cost £132. Even this is extremely reasonable as anyone who has to do with building hospitals will know.

Maintenance Costs. Quoting from the same example where the majority of cases do not require very heavy

or very expert nursing, costs work out at about 6s. 4d. per patient day. This includes food, transport, certain clothing and services rendered by settlement residents and paid for such as cooking, washing and ironing, cleaning, sewing and mending. The staff should consist of settlement residents and all service posts should be open to ex-tuberculosis sufferers.

It is vitally important that ways and means must be thought out whereby the community can themselves have a big part in the establishment of the settlement and a share in the provision of services.

X. The Full Life. It will be realized that with this very much more comprehensive concept of the function and place of the settlement, although ill health brought it into being, the hospital idea of a place where there is a straight fight between medicine and disease would not be carried over and would be far too restricted.

Hospitals are designed to deal with the negative physical aspect of health, namely disease; the settlement fills a much more complete role. Some of the essentials are listed below:

i. **Medical.** Conservative curative treatment of disease. Rest, and in this would be included the rest techniques of artificial pneumo-thorax, pneumo-peritoneum, phrenic nerve crush or cut, postural treatment, etc.

The whole range of preventative tuberculosis medicine, BCG, dietetic control with high intake of first-class proteins, the vitamins, particularly D, calcium therapy and other essential mineral intake. The general practitioner service that any community of 500 persons would need, could be done by a visiting doctor.

ii. **Education.** Ordinary schooling facilities, say from infants up to Standard VI. Nursery school, adult education, vernacular education. Education of sufferers as to exactly what is going on in their own bodies so as to gain intelligent co-operation. Precautionary methods for preventing the spread of disease to their families. Families, particularly the women instructed in how to protect themselves and their children. There will be technical education in the industries. The programme may sound formidable but these activities come into being and carry on quite normally in a keen community. At the settlement already instanced all except the nursery school are in operation and that is becoming such a pressing need that it cannot avoid being supplied.

iii. **Economic.** There will be production, primary and secondary, and a pride in it. Subsistence needs will in time be met and the time will come when there will be a marketable surplus. Every maintenance service need will be met by the settlers themselves for which remuneration should be given.

Every family should have security either through earning or grants and the latter will tend to die out.

There should be a community co-operative store where the people would be guided in spending, both as regards the necessary foods and how to make limited means go round to the best advantage.

iv. **Religious.** There should be provision not only of a place such as a House of Meditation, but also of time during which such a place could be used although there need be no organized worship unless there was a demand.

v. **Recreation.** Such activities as Scouts and Guides, sewing clubs, debating groups, bioscope and bathing, indoor and outdoor games, a library with suitable books, a settlement orchestra, etc.

These essentials are all of them channels through which healing can and does flow. Just as on the physical side with the individual it is the raising of the tone of the whole body, skin, respiratory, excretory, circulatory and digestive systems which is a prerequisite for withstanding and overcoming tuberculosis, so with the group it is the happy, active group with a vital purpose which will soonest be free of tuberculosis besides supplying the most helpful medium for the cure of the individual.

XI. Types of Settler. Contact families for prevention.

A. The Complete Family: 1. Where the wage earner, because of tuberculosis, will never be able to enter into the competitive labour market again. Similarly, where the mother is also so affected.

2. Where one or both of the parents are chronic cases. Special isolation accommodation would have to be provided for the positive spitter.

3. Where the sufferer is too ill to be in the home, he should be accommodated in a simple ward type of building, away from the family cottages, in which his family would be. When sufficiently recovered he could join his family and help to support them.

4. Where the sufferer is in a regional hospital for treatment, his family should have a cottage to which he hopes to return.

B. The Incomplete Family: 1. Widows and children where the wage earner has died from tuberculosis.

2. Children where both parents are dead, or the mother dead and the father requiring nursing care. Sunshine Homes are the type of accommodation needed.

PATIENT CATEGORIES

1. Children who are ill with primary tubercle. Rest and food treatment. Simple children's Wards. Maximum fresh air. Schooling.

2. Pleural effusion cases. Rest and food treatment. Continuation classes. Training in handcraft.

3. Very early cases. Food, rest and fresh air. Prospect of early return to normal life.

4. Artificial pneumo-thorax and pneumo-peritoneum after successful induction. Refills carried out on settlement. Work therapy.

5. Hopeful cases awaiting admission to hospital for active treatment. Diversional therapy.

6. Orthopaedic, both adult and child cases, for pre- and post-operation building up treatment. Occupational therapy. Schooling.

7. Early release cases from hospital. Because of settlement accommodation, all hospital cases can be released much earlier.

It will be seen that all cases that do not need heavy nursing can be dealt with in settlement accommodation. The expensive hospital bed will be restricted to the minimum number of patients and for the minimum amount of time necessary.

XII. Hospital In and Out Flow Regulation through the Settlement. It is suggested that the settlements in any region act as filters through which all cases

requiring hospital should pass. This would include certain groups of cases discovered by mass X-ray.

All cases leaving hospital should be drafted back to the settlement either for a shorter or longer period of reconditioning or where necessary, for permanent rehabilitation in settlement life. This would consolidate the work done by hospitals. In order to get this accepted by patients, it would be essential for them to be informed on entering hospital that a definite period at the settlement was an essential part of treatment, and if unwilling to accept this, then it would be a waste of time coming into hospital at all.

Recently, at FOSA Settlement, in Natal, six cases discovered by mass X-ray were taken in. They were not considered suitable types, but the settlement had beds and the hospital had not. They were taken on the understanding that they were awaiting hospital beds.

No.	Age	Period (months)	Weight gain	Change in X-ray picture	Comments
1.	18	6	33 lb.	Infiltration left apex	Practically clear.
2.	18	6	12 lb.	Bilateral apical infiltration	Good clearing both upper lobes.
3.	19	6	6 lb.	Bilateral apical infiltration	Marked clearing both upper lobes.
4.	22	6	16 lb.	Infiltration cavity 2nd L.I.S.	Continued clearing. Now on 2 hours work. Chest clear.
5.	23	6	34 lb.	Left plural effusion	
6.	32	5	30 lb.	Infiltration right middle and low zones.	Practically clear. Returned to work.

There is now no need for these cases to be admitted to hospital. Their treatment has been purely conservative. Good food, sleeping outside day and night. To begin with, up for meals only. Cases 2 and 3 continued studies for J.C. and Matriculation. The former passed in December; the latter is sitting his supplementary Matriculation now.

XIII. Time Factor and Work. As stated before, the settlement prospect must be put in front of the patient as an essential part of his cure right from the time treatment is started.

A planned time chart of what can happen if all goes well and dependent on full co-operation of the patient, should be laid out. Things will quite possibly go wrong, when a re-assessment of the position must be made by patient and doctor. A plan to work to is a definite stimulus and the patient knows at the outset what is required of him.

1. Patients requiring five months or less. To return to pre-illness employment. Start on two hours per day at settlement—some skill, such as carpentry, that will be useful in after life, as a hobby. Time to be graduated as well as strenuousness of work, until by the end of four months patient is at normal work strain.

2. Patients requiring about 12 months to return to pre-illness employer, preferably in a less strenuous

capacity. More gradual building up to full employment strain. Some training for new occupation.

3. Patients requiring trying out at settlement for up to five years.

For the young: To be taught a trade and do continuation classes, aim at passing Matriculation. Preparation for marriage.

For the Older: To have family on settlement in a cottage. To attain four hours work per day before being drafted back into home. To be re-trained for employment. To be remunerated up to pre-illness level.

4. Patients requiring indefinite stay under controlled conditions either due to permanent physical weakness or continued infectivity, or to having broken down for the second time.

For the Young: To live in settlement hostel for young people. To be trained to take responsible positions in settlement life and industry. To look forward to permanent life on the settlement.

The over-riding factor in the assessment of patient's grade, the future life and type of work he will be able to carry on, and the rate at which he is to be stepped up to normal, must be his medical condition as assessed by the doctor on the basis of examination by X-ray or screening, his weight and other medical criteria.

XIV. Relative Importance of Physical Condition and Mental Attitude. The belief that the patient's attitude of mind and moral strength are more vital factors than the physical ones must be inculcated, but it is up to the settlement staff to demonstrate this by measurable and visible improvement in physical standards.

It is the will to live that often decides the issue. When patients go before the doctor on his periodic visit to the settlement and say 'Can I have another two hours work, doctor?' then the whole set-up has really achieved something. When patients earn a living wage in a settlement industry, whether on full hours or not, and write to the Department of Social Welfare to say that they no longer need disability grants, this is rehabilitation at its best and anything can happen.

XV. Conclusion. It is in the nature of isolation that it can only be temporary measure.

On the settlement, where all the factors making for a full life are in operation, it is clear that a more all-round healthier individual will be produced, because it is a much more normal life, and it should be the aim to bring people back to as normal a work and family life as is possible in as short a time as possible.

The problem of recidivism will not be so great and as a problem will almost entirely disappear. Those who live on the settlement will, because of the graduation of physical exercises, of training for work, tend to fit into normal society with no maladjustments.

We cannot deal with the problem of tuberculosis on the present basis of hospital costs. Particularly is this so with our Native people. The settlement offers an alternative for a large proportion of types of tuberculosis patients as well as for a large proportion of the time in the programme from diagnosis to arrest.

It can definitely provide the means whereby all in danger from tuberculosis may live to the fullest that their medical condition allows.

THE DIETARY CALCIUM REQUIREMENTS OF MAN

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The calcium requirements of man have been the subject of a great deal of work and thought and the subject has been recently discussed by Stearns (1950). The older investigators, who were ignorant of many of the peculiarities of Ca metabolism, arrived at figures which were in many cases incorrect. Sherman (1920), studying balance figures from the literature and from his own observations, supposed that if the subject was in negative balance, the addition of the Ca lost would bring him into equilibrium, and if the Ca balance was positive, the requirement was equal to the intake minus the Ca stored. He was unaware that only part of the ingested Ca was utilized and, since most of his subjects were in negative balance, the requirement figure he arrived at was too low.

It has now been realized that, unless very carefully controlled, the results of balance experiments can be very misleading. In fact Kraut and Wecker (1943) regret there is not some method independent of metabolic experiments which could be used instead. In the case of children a new method has been suggested, which will be described below.

Before embarking on this, however, one or two further aspects must be considered. The terms 'retention' and 'utilization' mean virtually the same, but have been given, especially by Mitchell and his colleagues, different connotations when applied to Ca. Retention refers to all the Ca in a diet, while utilization is usually restricted to the Ca of one foodstuff being investigated, e.g. milk.

It is not generally realized that the retention of Ca in man is very low. In infants this is on an average 34% of that ingested, and in children and adults about 20 to 30% (Jeans, Stearns, McKinley, Goff and Stinger, 1936; Kinsman, Sheldon, Jensen, Bernds, Outhouse and Mitchell, 1939; Steggerda and Mitchell, 1946a).

Another factor to be considered is that of the maintenance requirement or endogenous loss. The exact source of this Ca is still undetermined, but it arises from Ca metabolism processes other than those involved in growth, and occurs in both faeces and urine. Thus not all faecal Ca is unabsorbed Ca but quite an appreciable amount is or can be actively excreted by this route. This has been unequivocally shown to occur in man by Steggerda and Mitchell (1946b), who have disproved the theory put forward by McCance and Widdowson (1939) that active excretion of Ca by the intestine does not occur in humans.

CHILDREN

Maintenance Requirement. It has been shown by Kinsman *et al.* (1939), by an ingenious method, that the growing child has no maintenance requirement, and that all the Ca retained is utilized for growth. This method is based on a formula devised by these workers

for calculating the utilization of Ca in various foodstuffs, as follows:—

Percentage Utilization=

$$\frac{\text{Retention for Period A} - \text{Retention for Period B}}{\text{Intake for Period A} - \text{Intake for Period B}} \times 100$$

Period A is that of higher Ca intake and B of lower intake. This formula is valid provided that any endogenous loss is not affected by the level of Ca intake and also provided further, that the Ca intakes in the two periods do not exceed the minimum requirement for maximum retention. The formula was introduced in order to avoid the inaccuracy that would occur if there was a continuous endogenous loss unrelated to the Ca intake, which would make the utilization appear lower than it really was. By this method, such a loss cancelled out and the true figure for the utilization of the extra Ca given during period A (in this case milk Ca) could be accurately assessed.

On applying this formula to their findings in children, Kinsman *et al.* found that the figures for the retentions in periods A and B and for the utilization of the milk Ca were all the same, indicating that there was no endogenous loss. This simplifies the problem considerably in children, since all the Ca retained is used solely for growth purposes.

Analytical Method of Terroine. Terroine studied the increments of body nitrogen during growth and from this calculated the requirements of this element in children (1936). This analytical method, which is fundamentally the soundest so far described, requires, in the case of Ca, a knowledge of the daily Ca gains in the body and of the utilization of the dietary Ca. From this the daily Ca requirement can be calculated; the Ca gains must, of course, integrate to the figure for the total adult body Ca.

It must be straightaway admitted that our knowledge of the Ca content of the body of children is almost non-existent, and that of the Ca content, skeletal weight and water content of the adult body is very sketchy. Figures in the literature for the total body Ca of adults range from 1.14 to 3.6%. The latest figure, obtained by Mitchell, Hamilton, Steggerda and Bean (1945), for total adult body Ca, 1126 g. for a body weight of 70.55 kg., or 1.596%, is the most accurate so far.

Values for the Ca content of the growing child have been calculated by a number of workers and the results up to 1945 have been summarized by Holmes (1945). Shohl (1939) assumed that the weight of the skeleton, as a percentage of the total body weight, rose up to six years of age and then remained constant, the percentage of Ca in the skeleton gradually rising as age increased. Mitchell and Curzon (1939) assumed that the gains in Ca were a constantly rising percentage of the gains in

total body weight and that the weight of the fresh skeleton was a constant percentage of the body weight. Venar and Todd (1933) based their figures upon the weights of fresh skeletons dissected from children, and proposed that there was a rise in proportionate weight of skeleton up to six years of age and then a decline. Holmes herself also worked out the Ca accretions on the basis that these were almost in the same proportions as those of total body weight. In the case of Holmes' figures, the Ca gains added up to a figure of 1.6% in the adult.

Holmes has pointed out that Venar and Todd's figures were quite out of keeping with what might be expected, since the greatest accretion was during the time of least growth. It has been suggested that the children they dissected were not normal. The method of Shohl, while looking 'correct' in early life, took no account of pubertal growth and presumably increased storage of Ca during this time. The methods of Mitchell and Curzon and of Holmes gave results which might have been expected, since the greatest accretions of Ca occurred during the fastest growth. Incidentally, the Ca storage figures obtained from balance experiments were all much higher than those worked out by any of these methods.

In a later paper Mitchell *et al.* (1945) analysed a fresh male cadaver and obtained the most accurate figure so far for total Ca, 1.596%. They pointed out that the composition of various bones differed quite widely, so that the composition of the skeleton could not be estimated from that of a single bone.

On the basis of this more accurate figure for the adult Ca content, these workers re-assessed the estimate of the daily Ca increments during growth. The growth data of Meredith (1941) were used, and these assumptions were made:

(a) That the Ca content at birth is 0.8% (Coons, 1935);

(b) That that in the adult is 1.6%;

(c) That the change from the infantile to the adult percentage occurs progressively during growth, but more rapidly when growth is more rapid. Thus the Ca contents of the gains in weight were greatest over the period of 14 to 18 years.

This final assumption was based upon findings with growing rats, chickens and lambs, and it appeared valid to apply them to humans.

In Table I the writer has worked out the Ca requirements for boys from the data calculated by Mitchell and Curzon, Holmes, and Mitchell *et al.* It did not seem to be particularly useful to include those of Shohl and of Venar and Todd, since, as stated above, their findings are open to suspicion. The following formula was used:—

$$\frac{\text{Daily Ca Accretion}}{\text{Percentage Utilization}} \times 100 = \text{Daily Ca Requirement.}$$

The utilizations are arbitrarily placed at 34% for 1-5 months, 30% for 6-11 months, 25% for 1-2 years and 20% over the rest of the growth period. In the Table are also included the recommendations of the National Research Council of the United States (1941) and of the National Nutrition Council of South Africa (1942).

The National Research Council revised its Table of recommended daily dietary allowances in 1948, but did not alter the allowances for children.

It will be seen that the figures of Mitchell and Curzon, and of Holmes, agree in general, in that there is a high Ca requirement after birth, which falls till about the age of 5, and then gradually increases up to 11 years. After that there is a very large increase corresponding with pubertal growth and then a fall as growth slows. Since these figures are for children and only allow for growth, some of the figures for 17, 18 and 19 are too low owing to the development of a maintenance requirement.

In detail, however, these figures show several disagreements. Thus the Holmes figures are much higher than the Mitchell and Curzon ones for infants in the first few months of life. Fair agreement in all three sets occurs over the ages of 1 to 6 years, though the Holmes figures all tend to be higher. After this period, agreement is not very good, though the tendency of change is in the same direction in all.

It will be seen that the requirements immediately after birth, especially those based on Holmes' figures, are tremendous and cast doubt on the validity of the utilization figure. Holmes herself says that the average mother would be quite unable to provide enough milk for all this Ca and the baby in any case could not drink enough milk, either cow's or human, to obtain such an amount. Aron many years ago (1908), suggested that the Ca of breast milk must be largely retained. Jeans *et al.* (1936) and Rominger and Meyer (1927) have noted very high retentions of Ca in infants. This problem should be investigated further.

Of the three sets of figures, the present writer is inclined to favour those of Mitchell *et al.* (1945). Mitchell and his colleagues clearly indicate that these figures supersede those of Mitchell and Curzon. The figures of Holmes are based on virtually the same assumptions as those of Mitchell *et al.*, but she used different growth data. This probably accounts for the difference in the two calculations, which are not serious in the most important phase of growth, namely from 11 to 15 years.

The figures recommended by the National Research Council are, in general, much higher. These are from data available at the time and based on balance experiments. In a footnote it is stated that the Ca figures could be reduced for infants if breast milk was used.

It is also stated that the needs for infants increase from month to month. The figures in Table I do not support this statement as far as Ca is concerned. The present writer feels that the figures recommended by the National Research Council are throughout too high, due in large measure to the fact that balance data, when they err, usually do so in an upward direction. The recommendations of the Committee on Nutrition of the B.M.A. (1950) are similar in general to those of the National Research Council. The figures recommended by the National Nutrition Council of this country are lower in the earlier years than those of the National Research Council. This lower figure was adopted since it was felt that the high vitamin D dosage from sunshine would be an adjuvant to Ca absorption largely absent

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in northern climes. For later childhood and pubertal growth, the National Research Council figures were followed. However, in spite of the reduction in the figure recommended for early childhood, it is felt that these figures are also too high.

Suggested Ca requirements. In the last column have been placed figures based on those of Mitchell *et al.* for the recommended daily Ca intake over the period of 1 to 19 years. They have been rounded off and include as large age groups as possible. In the case of 18 and 19 years, since a maintenance requirement has probably now developed, the adult figure is recommended. The writer does not feel competent, in the state of present knowledge, nor apparently do the two Councils quoted, to recommend any figures for the first period of life. For early childhood years, it will be seen that the recommendations are much lower than those previously suggested. The figure then increases to 1000 mg. at 11 years, and goes up to a maximum of 1300 mg. at 14-15 years. It then gradually falls to the adult figure.

In the absence of comparable data for females, it is not possible to calculate the Ca requirements for girls. Presumably, when such data come to hand, it will be found that the figures are of the same order as those for boys, but at a lower level.

ADULTS

In the adult a maintenance requirement exists and it is only to balance this that a continual intake of Ca is required, provided that the individual is in Ca equilibrium in other respects. It is these other respects that have made the question of the true figure for Ca requirements so hard to arrive at. Thus a person who has lost Ca for some reason may be found to be in positive balance when investigated, while a subject who has stored Ca may well be in negative balance. For this reason, balance experiments, which are the only method at present available for these studies, must be conducted under the most carefully controlled conditions as to the Ca level of the previous diet, and the length of time the subject has been subsisting on this.

TABLE 1: CA REQUIREMENTS OF BOYS BASED ON VARIOUS CALCULATIONS (MG./DAY)

Age	M and C	H	M et al.	N.R.C.	N.N.C.	J.T.I. based on M et al.
1 month	1230	1765	—	—	—	—
3	694	1338	—	—	—	—
6	550	1040	—	—	—	—
9	447	694	—	—	800	—
1 year	465	689	640	—	—	650
2	430	536	525	—	—	—
3	345	440	350	—	—	—
4	295	440	265	—	—	—
5	300	460	250	1000	900	400
6	370	555	300	—	—	—
7	420	615	395	—	—	—
8	480	700	526	—	—	700
9	550	765	675	—	—	—
10	635	840	835	—	—	850
11	740	910	986	1200	1200	1000
12	856	985	1115	—	—	1200
13	1005	1060	1210	—	—	—
14	1165	1374	1254	—	—	1300
15	1735	1354	1245	—	—	—
16	1435	985	1154	1400	1400	1200
17	966	670	980	—	—	1000
18	630	410	705	—	—	700
19	410	160	315	—	—	700

M. and C. = Mitchell and Curzon (1939).

H. = Holmes (1945).

M. et al. = Mitchell *et al.* (1945).

N.R.C. = National Research Council of the U.S.A. (1941).

N.N.C. = National Nutrition Council of South Africa (1942).

The writer feels that the calculations of incremental Ca gains on which these figures are based are not far wide of the mark, though he would urge anatomists and biochemists to analyse healthy bodies when opportunity offers, so that such calculations may be based on fact and not assumption. He considers that the Ca requirements recommended in the last column of Table I represent the nearest approach to the true Ca requirement for growth so far attained.

In spite of these precautions, it must be admitted that the experimental evidence on which the various recommendations are based, is not entirely satisfactory.

Existence of a Maintenance Requirement. This can easily be shown by applying the formula of Kinsman *et al.* (1939) to balance data of adults on two levels of intake. Thus in the case of subject No. 6, studied by Owen, Irving and Lyall (1939), the following is found:—

Intake (mg./day).	Loss (mg./day).	Retention. (mg.).	Percentage Retention.
266	259	+7	3
581	433	+148	25
Utilization of the extra Ca = 45%.			

On the assumption that all the dietary Ca is utilized to the extent of 45%, 55% of the 581 mg. intake or 319 mg. is lost. This figure, when subtracted from the total loss, gives 114 mg., which is the endogenous loss. Incidentally, the above data show how misleading the total retention figures are as an index of the utilization of dietary Ca, when the formula of Kinsman *et al.* is not applied.

Adaptation to Various Levels of Ca Intake. As has been pointed out by Mitchell (1944) the body is, within limits, capable of an immense power of adaptation to various nutritional levels, both high and low. Thus Owen (1939) and Owen *et al.* (1939), working with subjects very carefully controlled as to the previous dietary history, found two groups, one in equilibrium on 520 mg. and the other on about 300 mg. Ca per day. These two levels were the same as those that the subjects had been subsisting on for some time before the investigation began. In a recent paper, Walker, Fox and Irving (1948) have drawn attention to investigations reported in the literature where natives have been found to be in equilibrium on very low intakes of Ca. Some workers have thought that the Ca requirements of these people were less than those of Europeans (e.g. Nicholls and Nimalasuriya, 1939, reporting on Cingalese). It seems much more likely that these equilibria have been arrived at as a result of adaptation to a low intake. Walker *et al.* (1948) report balance data on A.W. whose Ca intake was reduced from 1160 mg. to about 500 mg. per day. It took this subject eight weeks to adapt to the lower level, and during this time he was in negative balance, losing in all about 2 g. of Ca. After this period, he went into positive balance and stored about 3.2 g. Ca over the next nine weeks while still on an intake of 500 mg./day. The lowering of the intake was accompanied by a higher intake of brown bread containing much phytic acid. It is true that much of the recovery of Ca was while on a diet of white bread. Nevertheless, strong positive Ca balance had been established while still on the brown bread diet and before the change was made. This power of adaptability has also been greatly stressed by Kraut and Wecker (1943, 1948). There is evidence that it may be partly due to an increased utilization of Ca.

Steggerda and Mitchell (1941) have summarized the situation as follows:—

It appears that in the presence of an inadequate supply of any nutrient, including calcium, the body can adjust itself to the situation, either by a more economical use of what little is available, or by a lowering of its own requirements, so that eventually it comes into equilibrium with the limited food supply. Only during this adjustment period can the body be adjudged undernourished, since only in this period is the body suffering a loss of nutriment. When adaptation is complete, the body replaces from its restricted supply all losses of the nutrient from its body, and unless some subsidiary ill effects ensue, it may reasonably be regarded as adequately supplied with food.

Mitchell (1944) adds 'If I were to edit this statement to-day, it would be only to safeguard against a possible implication that the body can adjust itself to any nutritive level, however low. Obviously, adjustment is possible only within certain limits at present unknown.'

Results of Balance Experiments. Taking the above facts into consideration, we are in a position to assess the results of balance experiments and the deductions drawn from them. It is obvious that the subjects must be in good health on their Ca intake. More than half of those studied by Owen *et al.* (1939), on an intake of 300 mg./day, had osteoporosis and the calcification of most of the rest was not satisfactory. Thus this intake is too low. The old subjects studied by Owen (1939) appeared in health on an intake of 520 mg./day. Unfortunately the weights of these men were not recorded. Thus one could *a priori* say that probably 500 mg. is about the lowest level for maintenance.

Leitch (1936-37) selected from the literature a large number of balance data on healthy women both in positive and negative balance. On plotting intake against output, the level of Ca intake above which losses and gains of Ca were equal was 550 mg./day. This worked out at almost 10.0 mg./kg. body weight.

Mitchell and Curzon (1939) selected 139 observations from the literature on 107 subjects of whom 18 were men. These results were plotted with respect to intake and output and a straight line fitted to the data by the method of least squares. This line intersected the diagonal at 9.75 mg./kg. body wt./day, a figure which agrees well with that of Leitch obtained by an analogous method.

In a more recent experimental study of nine normal male subjects (Steggerda and Mitchell, 1941) when the availability of milk Ca was being investigated, an average Ca requirement of 9.55 mg. per kg. body wt./day was arrived at. In their most recent study Steggerda and Mitchell (1946a) investigated 19 men. The diet periods were 20 days and 75 such periods were considered. In both these studies, the subjects were first on a basal diet of very low Ca content (about 200-250 mg./day); the Ca level was then increased by the addition of various milk products. From these figures they could calculate the percentage utilization of the extra Ca by the method of Kinsman *et al.* (1939). The negative balance was then divided by the percentage utilization and multiplied by 100. This gave the amount of Ca needed to wipe out the lost Ca, and on being added to the intake of Ca gave the total requirement. Thus in a subject with a utilization of 32%, the total intake was 458 mg. and the balance,—57 mg. This loss would be abolished by the addition to the diet of $\frac{57}{0.32} = 178$ mg.; $178 + 458 = 636$ mg., which is considered the total daily Ca required. Averaging all the results, the daily Ca requirement came to 9.21 mg./kg. body wt.

This is an ingenious method, but is not free from certain criticisms. Thus it is assumed that all the dietary Ca is utilized to the same degree as the extra Ca, which is probably true, but in the absence of a figure for the endogenous loss, can only be surmized, since the calculation of the endogenous loss given above

also assumes that all the dietary Ca is utilized to the same extent as the extra Ca. Also, the subjects were first on the basal low Ca diet, which caused them to lose appreciable amounts of Ca. Putting them back on to a higher Ca level would cause them to store Ca, which they might not have done on this intake, if the previous low Ca period had been omitted. Thus the balances on the higher Ca intake must have been more positive or less negative than they should have been. The average Ca utilization figure, 31.6%, is high and possibly caused by this. In actual fact, these possible errors probably cancel each other out so that the calculated requirement is not wide of the mark.

Steggerda and Mitchell in their paper (1946a), summarized their present and earlier findings (1941), certain unpublished data, and also calculations from work by Breiter, Mills, Dwight, McKey, Armstrong and Outhouse (1941), who conducted similar balance experiments. The means of the daily Ca requirement per kg. body wt. varied from 9.21 to 11.61 mg., and averaged for 43 individuals 9.99 mg. Taken in conjunction with the earlier suggestions, using different methods, by Leitch of 10.0 mg., and Mitchell and Curzon of 9.75 mg., it must be agreed that the correspondence is quite remarkable. In view of the findings of Steggerda and Mitchell, Walker *et al.* (1948) adjusted the Ca intake of three of their subjects to a level of 10 mg./kg./day, and found that they either were in equilibrium on this intake, or else adapted to it without difficulty.

Steggerda and Mitchell (1946a) recommend a daily intake of 10 mg. per kg. body wt., provided that an average proportion of Ca comes from dairy products. They do not feel that a 'margin of safety' is needed. In the case of the individual who has been accustomed to more, the adaptive mechanism will come into effect and, judging from the experiments quoted above, will cause very little physiological disturbance at this level of intake. The National Nutrition Council of South Africa followed the original recommendations of the National Research Council of the U.S. (1941), which were 800 mg. per day for both men and women. In the revised Table (1948), the National Research Council raised the proposed allowance even higher, to 1,000 mg. per day for men and women. The Committee on Nutrition of the B.M.A. (1950) remarked that they had no little difficulty in reaching a decision about Ca requirements, and that they were impressed by the growing body of evidence that the human body readily adapts to levels of Ca intake considerably lower than those recommended. They also stated that they were not impressed by the arguments which led the National Research Council to raise the Ca allowance.

It was stated earlier that the results of balance experiments must be accepted with caution. The data quoted above are based on most carefully conducted experiments, in which subjects in good health were investigated over long periods. The present writer feels that the recommendations of Mitchell and his colleagues are the most accurate assessments obtainable by the method of balance experiments, and in the absence of some method based on quite different principles, should be accepted. Thus the recommendations of the two

Councils quoted are higher than necessary. The daily Ca intake should be 700 mg. for an average man of 70 kg., and 560 for an average woman of 56 kg.

Pregnancy and Lactation. The two Councils recommend figures of 1500 mg. per day during the latter half of pregnancy and 2000 mg. during lactation. No investigations have taken place since their tables were drawn up to suggest that these figures be altered. It is therefore proposed that they remain at present unchanged.

SUMMARY

Various computations of the Ca content of the body of the growing boy, based on existing knowledge, are described. The daily dietary intakes needed to supply the Ca accretions have been calculated and compared with the daily allowances recommended by official bodies. The calculated daily Ca intakes are lower than those recommended.

Recent work on the Ca requirements of adults is reviewed. From this it is concluded that 10 mg./kg. body wt./day is adequate for an adult man and non-pregnant woman.

The writer feels that the officially recommended daily Ca allowances are too high for both children and adults.

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remains which subsequently becomes infected. Constrictor muscles and even deep vessels of the neck may be damaged in attempting to remove all tonsillar tissue. Tonsillar remnants left are usually covered by a dense scar, preventing drainage from crypts, thus favouring systemic absorption as well as attacks of peritonsillar abscess.

The danger of secondary haemorrhage is considerable and when it does occur, it is difficult to control.

OFFICIAL ANNOUNCEMENT

ASSISTANT MEDICAL SECRETARY

Applications are invited from bilingual medical practitioners for the post of Assistant Medical Secretary of the Medical Association of South Africa at its Head Office in Cape Town.

The Salary scale is £1,250 × 50—£1,500 plus cost-of-living allowance at Government rates (£208 per annum for married persons and £57 4s. for single persons).

The successful applicant will be required to subscribe to the Association's Pension Scheme.

Applications should be addressed to the Medical Secretary, P.O. Box 643, Cape Town, and should be accompanied by three recent testimonials. Closing date for the receipt of applications 31 August 1950.

AMPTELIKE AANKONDIGING

MEDIESE ASSISTENT-SEKRETARIS

Aansoeke deur tweetalige geneeshere word gevra vir die betrekking van Mediese Assistent-Sekretaris van die Mediese Vereniging van Suid-Afrika by sy Hoofkantoor in Kaapstad.

Die salarisskaal is £1,250 × 50—£1,500 plus lewenskostetoelae teen Regeringskaal (£208 per jaar vir getroude persone en £57 4s. vir ongetroudes).

Van die suksesvolle aansoeker sal verlang word dat hy by die Vereniging se pensioenskema aansluit.

Aansoeke moet gerig word aan die Mediese Sekretaris, Posbus 643, Kaapstad, en moet vergesel word van drie resente getuigskrifte. Sluitingsdatum vir die ontvangs van aansoeke 31 Augustus 1950.

QUESTIONS ANSWERED

REMOVAL OF TONSILS

Q. What is the most effective method of rendering septic and enlarged tonsils harmless to a patient? Dissection or some other method? Is there a method of achieving this end by electric cautery? If so, please give details concerning technique and results.

A. At present, dissection of tonsils is the best available method of rendering septic and enlarged tonsils harmless to a patient. A good operator is practically certain of removing all the tonsillar tissue. With the guillotine, even in expert hands, some tonsillar tissue may be left.

Electrocoagulation is a method used, more commonly in the United States than elsewhere. The technique is as follows:—

All instruments used are made of insulated material. Topical analgesia by cocaine, Pantocain, etc., is employed in preference to infiltration analgesia. An indifferent electrode made of block tin is attached to the nape of the neck or is placed on the chair under the patient, or a bi-active tonsil coagulating electrode may be used. The needle is brought into contact with or plunged into the area to be coagulated and the current switched on and off by means of a foot switch. Approximately from 200 to 300 Ma. of current is the average setting necessary. One tonsil is usually treated at a time, a small area selected first on one side, then on the other, at weekly intervals. The procedure is only to be considered completed when the fossae are clean.

Results are not good. At best, some hidden tonsillar tissue

PASSING EVENTS

M.B., B.Ch. FINAL (WINTER) EXAMINATION RESULTS WITWATERSRAND UNIVERSITY

The following candidates have completed all the requirements for Part II of the Final Professional Examination for the degree of M.B., B.Ch., University of Witwatersrand (June 1950):—

Axelrod, S.; Bader, E.; Bobrow, S.; Broome, D. C. N.; Chavkin, I.; Edelman, S. J.; Irwin, C.; Joubert, C. J. J.; Lever, A.; McCall, D. S.; Mcasa, L. L.; McNabb, W. J.; Moss, D. W.; Ntshona, W. B.; Peteni, J. M. N.; Pretorius, N. J.; Rwairwai, E. D.; Smit, B.; Titlestad, E.

UNIVERSITEIT VAN PRETORIA

Die volgende kandidate het in Junie 1950 aan die eksamene vereistes vir die M.B., B.Ch.-graad voldoen:

Archer, Hermanus Wilhelmus; Bingle, Johannes Petrus; Calitz, Frederick Jacobus Wilhelmus; de la Port, Pieter van Zyl; de la Rey, Johannes Petrus; Dieperink, Johannes Andries; Grové, Pieter Stephanus; Hauptfleisch, Christiaan; Heunis, Wynand; Kotzen, Isidore Cyril; Lessing, Abraham Johannes Petrus; Richter, Johannes Gysbertus Marthinus; Ries, Christian Jacob; Steyn, Louw; van Schalkwyk, Leon Marius; Vorster, Barend Johannes.

Dr. Ben Joffe, formerly of Cape Town, has recently returned from overseas where he spent three years doing post-graduate work in general surgery. Dr. Joffe has obtained the Fellowship of the Royal College of Surgeons, Edinburgh.

Prof. R. H. Goetz of the Department of Surgery, Medical School, University of Cape Town, has been appointed to the Editorial Board of a new journal entitled *Angiology*. This journal, devoted to the study of vascular diseases, was recently established by the Angiology Research Foundation in the United States of America.

The official delegation to the International Conference on Radiology to be held in London in July has now been chosen by national ballot.

The members of the delegation are Dr. J. Kaye, Dr. J. G. Nel, Prof. S. F. Oosthuizen, Dr. E. Samuel and Dr. M. Weinbren.

Professor Oosthuizen has been elected leader of the delegation and he will also represent the University of Pretoria, the University of Cape Town and the Council for Scientific and Industrial Research at the International Congress.

Dr. C. Cairncross, who has been overseas for some months, returns to South Africa in the *Capetown Castle* at the end of July 1950.

DUST DISEASES

The Governing Body of the International Labour Organization recently approved in principle the convening of an international conference of experts on pneumoconiosis.

The meeting will consider measures for preventing pneumoconiosis from the viewpoint of the physicist, chemist and engineer. It will enlarge on the work accomplished by the Third International Conference of Experts on Pneumoconiosis held by the ILO at Sydney, Australia, in March. The date and agenda of the conference will be considered by the Governing Body at a subsequent session.

The meeting—the Governing Body's 112th since 1919—was preparatory to the opening at Geneva on 7 June of the ILO's 33rd general conference.

REVIEWS OF BOOKS

HAM'S HISTOLOGY

Histology. By Arthur Worth Ham, M.B. (Pp. 756 with 445 figure numbers, including 4 plates in colour. 80s.) London: J. P. Lippincott Company. 1950.

Contents: Part I: *What Histology is and how it is studied.* 1. Histology and its Relationship. 2-4. How Histology is studied. Part II: *Cells, Intercellular Substances and Fluids.* 5. Cells. 6. Intercellular Substances. 7. Tissues Fluid. 8-9. The Cells of Blood. 10. Platelets and Fibrin. Part III: *The Four Primary Tissues and their Subdivisions.* 11. The Four Primary Tissues of the Body. 13. Epithelial Tissue. 14. Connective Tissue. 15. Cartilage. 16. Bone. 17-18. Hemopoietic Tissue. 19. Muscular Tissue. 20. Nervous Tissue. Part IV: *The Histology of the Systems.* 21. The Circulatory System. 22. The Integumentary System (The Skin and its Appendages). 23. The Digestive System. 24. The Respiratory System. 25. The Urinary System. 26. The Endocrine System. 27. The Female Reproductive System. 28. The Male Reproductive System. 29. The System of Sensory Receptors. 30. The System of Articulations. Index.

At rare and unpredictable intervals the history of modern education is arrestingly interrupted by an epochal contribution to the technique of teaching. Professor Ham's textbook of histology is of this quality and his work will probably influence the teaching of histology in all the English-speaking medical schools of the world as well as stimulate the medical practitioner who is anxious to fill in the many gaps in his basic training.

The author's apprenticeship to so distinguished a cytologist as Cowdry of the Washington University School of Medicine, St. Louis, is a sufficient index to the nature of his contribution.

The book follows a proportion and a perspective realistically integrated with the trends of disease in our time. Because degenerative diseases of the heart and the arteries account for more than 50% of deaths for which insurance claims are made, the author devotes considerable attention to the study of the tissue ingredients and structures in which degenerative phenomena occur. As cancer has come to be recognized as the second greatest cause of death in recent years, there is an adequate introduction to the study of the cell. Because burns and skin grafting are so important in modern surgical practice, the student finds a special presentation of the subject in the chapter dealing with the skin. Since diabetes recently ranked ninth as a cause of death in the United States, the islets of Langerhans in relation to diabetes mellitus and to the other endocrines participating in the production of this disorder come in for special treatment from this point of view.

These few examples illustrate the general and satisfactory perspective which the author has followed. There is, however, another unique and valuable feature in Professor Ham's presentation. He has not forgotten his own difficulties as a student in trying to master a three-dimensional understanding of organs presented for study in one plane; nor the vexatious and unnecessary difficulties introduced by artifacts in the preparation of microscopic sections. By presenting these problems clearly at the beginning of the book in a manner which strikingly demonstrates his brilliance as a teacher, the author paves the way for an intelligent approach to the study of histology and excites in the reader the enthusiasm which always accompanies biological exploration. The ability to grasp the three-dimensional construction of organs studied microscopically is the key-note to success in the appreciation of this fundamental branch of knowledge. This technique of presentation runs right through the book and is strikingly apparent in the way in which he handles, e.g. the account of the liver as well as of the kidney, which includes the important work of Oliver.

Inextricably interwoven in the mesh-work of Professor Ham's account is a natural and intimate correlation of structure with function, thus giving the student comprehension of and insight into the disorders which he will afterwards recognize in a patient as a disease or a departure from the anatomical normal.

Almost all modern textbooks of histology are distinguished by the excellence of their illustrations, yet even in this respect Professor Ham has bettered what we have thought of as the best. Not only are the photomicrographs of the highest excellence, but (and this is of utmost importance to the student) the preparation of special line-drawings to illustrate

specific problems and features places this book in a class by itself. No student can fail to grasp the complicated structure of striped muscle; or to understand the effects of venous obstruction on the formation of tissue fluids or appreciate the growth and development of bone if he uses this book as his guide.

The account of the structure of the lung includes the more recent work to which Professor Ham himself has made notable and significant contributions and which has completely revolutionized our conceptions of the behaviour of the lungs with the first act of respiration in the newly born. The progressive development of an alveolar pattern in this organ takes place independently of extra-uterine respiration in much the same way as an analogous development takes place in a structure such as the pancreas. This approach serves to demonstrate much of the mythology current in medico-legal practice and illustrates the healthy way in which the author has not hesitated to re-assess claims hallowed by nothing more substantial than the effluxion of time.

It is obviously impossible to understand histology apart from the functions of the structures studied. For this reason Professor Ham's textbook remains a most valuable introduction to physiology, pathology and general medicine. It should undoubtedly replace most of the unimaginative and orthodox presentations of the subject. The medical student will be well advised to acquire a copy of this volume whether it has been prescribed for him or not. For the medical practitioner who wishes to catch up on the important advances which have taken place in recent years, no better volume than this can be recommended.

HISTOLOGY

A Histology of the Body Tissues with a Consideration of Their Functions. By Margaret Gillison. (Pp. 220 +xiv. With 103 illustrations. 15s.) Edinburgh: E. & S. Livingstone Limited. 1950.

Contents: 1. Introduction. 2. The Preparation of Tissues. 3. The Surface and Lining Tissues. 4. The Connective and Supporting Tissues. 5. Cartilage and Bone. 6. Blood and the Tissue Fluids. 7. The Muscle Tissues. 8. The Nervous Tissues.

This little book fulfills a subsidiary and ancillary role in the study of the microscopic structure of human tissues. It is essentially a functional, physiological account, well illustrated with excellent line drawings and half-tone illustrations, the emphasis being on the working significance of the structures discussed.

The book should be useful not only to medical students, but also to students of the biological sciences generally. It is very attractively prepared and produced.

GLAISTER'S MEDICAL JURISPRUDENCE

Medical Jurisprudence and Toxicology. By John Glaister, J.P., D.Sc., M.D., F.R.S.E. (Pp. 755 with 234 illustrations. 88 in colour. 35s. 9th ed.) Edinburgh: E. & S. Livingstone Ltd. 1950.

Contents: 1. General Medical Council. 2. Medical Evidence. 3. Identification of Living and Dead Persons. 4. Signs of Death and Changes following Death. 5. Death Certification in England and Scotland. 6. Asphyxia. 7. Death from Lightning and Electricity. 8. Death from Starvation and Neglect and from Cold and Exposure. 9. Medico-legal Aspects of Wounds. 10. Examination of Blood-stains. 11. Diagnosis of States of Insensibility. 12. Impotence and Sterility. 13. Infanticide or Child Murder. 14. Rape and Carnal Knowledge. 15. Lunacy in its Medico-legal Aspects. 16. Law relating to Poisoning. 17. General Actions of Poisons. 18. Corrosive Poisons. 19. Metallic and Some Non-metallic Poisons. 20. Gaseous and certain Volatile Poisons. 21. Ethyl Alcohol. 22. Hypnotics and Antipyretics. 23. Vegetable Poisons. 24. Additional Poisons. 25. The Effects of the Atomic Bomb. 26. Food Poisoning. 27. Plant Irritants. Appendix Nos. I and II.

This is undoubtedly one of the most distinguished treatises on the subject. The considerable amount of full colour illustration, which was a noticeable feature of the previous edition, has been increased, the colour reproductions are excellent and true and there are several important and useful additions to and alterations in the text.

The novel legislation arising from the National Health Service has produced considerable changes in the appropriate sections of Professor Glaister's book, but the general reader

as well as the forensic expert will be particularly interested in such sections as that devoted to the medico-legal aspects of artificial insemination (pp. 368 to 370). The author records the interesting suggestion that a Semen Bank might be established. If this were practicable, it would certainly surmount many of the difficulties faced by the practitioner who has to employ individual donors. Pertinent questions regarding legitimacy, the problem of succession, the custody of the child in the event of annulment or dissolution of the marriage, divorce, incest as well as the attitude of the General Medical Council to a practitioner who undertakes the procedure of artificial insemination, are all raised very crisply. It is quite clear that, if the practice were to become more prevalent, some form of legislation would be essential.

Another interesting situation revealed in the new edition deals with the performance of non-statutory autopsies. It seems as if the routine post-mortem dissection conducted in University Departments of Pathology or at Medical Schools, with the consent of the nearest relative, will only protect the pathologist from a civil action by the kinsman who has given his consent.

Professor Glaister is of the opinion that there does not appear to be any legal authority for this position. The possibility of a criminal offence consequently arises. He quotes Speller who states, in *The Law Relating to Hospitals*, that the provisions of the Anatomy Acts are also applicable to present-day routine, pathological post-mortem dissections and that autopsies other than at the request of the Coroner are lawful only if in accordance with the Anatomy Acts.

This seems to describe very closely the position in South Africa and it is in the highest degree desirable that legislation should be enacted to regularize a necessary practice. A further complication is the lack of provision in the Anatomy Acts for the retention of organs. The situation is very serious, e.g. in Australia, where the position has become quite absurd. In a recent review of Rowbotham's *Acute Injuries of the Head* in the *Medical Journal of Australia*, 1950, p. 193, the reviewer states that 'the workings of the Coroner's Act prevent the post-mortem demonstration of head injury effects to students, who thus never have a chance to see the pathological condition for themselves, and likewise deprive the responsible surgeon from obtaining a ready check on his clinical judgments'.

Apart from the obvious importance to medical education, the practice of surgical techniques and the performance of clinical and pathological research, it is difficult to see how it will be possible to set up an Eye Bank or a Bone Bank unless the establishment of these desirable institutions is to be protected by appropriate legislation.

The chapter dealing with alcoholic intoxication is extremely valuable. It is important to note in one of the quantitative tests recommended for the determination of alcohol in body fluids and tissues, viz. the method of Kozelka and Hine, that this employs an alkaline trap which eliminates many other interfering volatile substances. This method is worthy of greater prominence, especially in view of the increasing and progressive tendency to sanction the taking of blood samples from persons arrested upon any charge. This provision has been introduced in a Bill presently before the Union Parliament and its effect will extend far beyond blood alcohol concentration analysis, because a blood sample could be used for any serological or biochemical investigation.

The main section of the volume is, of course, devoted to medico-legal pathology. This has been enhanced by many new and excellent illustrations as well as the plentiful use of case material.

Readers in this country will be interested to note that South African contributions to medical jurisprudence find mention in several places in Professor Glaister's volume, e.g. Gordon's work on the classification of deaths of medico-legal importance (pp. 148-150) as well as his report of a case of air embolism (p. 394). Professor Glaister has also noted the work by Shapiro on the microscopic appearances of the human foetal lung. This work points out how unwise it is to infer the act of respiration from lung microscopy, especially in the first 5-6 months of gestation. Indeed, pulmonary histology is more valuable, at this stage, in determining foetal age rather than respiration. For these pertinent reasons it is surprising that a different photomicrograph has not been substituted for the one shown in Fig. 197 as an example of unrespired foetal lung. Fig. 197 undoubtedly comes from a

foetus 4-5 months old and is misleading when taken for comparison with Fig. 198 on p. 403.

These, however, are very minor criticisms which do not detract from a most excellent and standard reference work on medical jurisprudence and toxicology.

HYSTERIA

The Diagnosis of Hysteria. By D. W. Abse, M.D., B.Sc., D.P.M. (Pp. 112 + xii. With 6 plates. 8s. 6d.) London: Simpkin Marshall, Limited. Bristol: John Wright & Sons, Limited.

Contents: 1. Introduction. 2. Aetiology and Psychopathology of Hysteria. 3. Clinical Manifestations of Hysteria in Indian and in British Soldiers. 4. Diagnosis. 5. Summary and Conclusions.

The undergraduate student as well as the general practitioner will be interested in and entertained by this readable account of hysteria, a subject of perennial interest to physician and student alike, but one probably due to assume a greater importance, even in peace-time, in the present framework of the developing Welfare State.

Several very interesting case reports enliven and illustrate the author's account of a most fascinating subject.

THE LARYNX

The Comparative Anatomy and Physiology of the Larynx. By V. E. Negus, M.S., F.R.C.S. (Pp. 230, with 191 figures. 30s.) London: William Heinemann Medical Books Ltd. 1949.

Contents: 1. Evolution of the Larynx. 2. Modifications for Olfaction. 3. Modifications for Respiration. 4. Specialized Mechanism of Respiration. 5. Function of Movements at the Glottis During Respiration. 6. Modifications for Deglutition. 7. Regulation of Intra-Thoracic Pressure. 8. The Purposive Use of Sound in Relation to the Sense of Hearing. 9. Employment of Sound as a Means of Communication. 10. The Mechanism of Phonation. 11. The Anatomy of the Human Larynx. Appendix Nos. I, II and III.

In these days, when medical science is dominated by chemical and experimental procedures, it is interesting to see what a rich harvest of knowledge can still be reaped with the scalpel. The crop, in this instance, is the complete story of the evolution and purposes of the larynx as deduced from a morphological survey of this organ in types representing the whole animal kingdom.

Mr. V. E. Negus is a distinguished London Ear, Nose and Throat Surgeon, and his results are to be found in this book, whilst most of his preparations are housed in the Museum of the Royal College of Surgeons.

Once again we have proof of the soundness of the Hunterian philosophy that he who seeks surgical wisdom and scientific satisfaction must resort to comparative anatomy and physiology.

With copious first-rate illustrations the successive stages of the phylogenetic development of the larynx are described, and the fundamental purpose of each modification is explained.

Beginning with the lung-fishes, he shows that the larynx is at first a simple muscle sphincter, to which at a slightly later stage a dilator is added. This evolutionary precedence of the glottis-closing function over the glottis-opening one is in itself an important observation, because as Mr. Negus points out in his third appendix, it gives the fundamental explanation of Semon's law. This is the term applied to the clinical fact that the abductor muscles of the larynx suffer sooner from neurological lesions than the adductor muscles, and he explains it by the evolutionary principle that structures which are the last to develop are the first to go.

In Amphibians, Birds and Reptiles the muscles of the larynx gain purchase, first of all, from a cricoid and two arytenoid cartilages, but soon a thyroid cartilage is separated off from the cricoid. Thus the valvular mechanism of the larynx is gradually elaborated to suit the breathing requirements of the different forms.

At an early stage the larynx acquires a secondary function in relationship to the sense of smell. For ages this was the

dominant determinant of survival, so that it is not surprising to learn that this valve on the air circulation apparatus has been modified to assist the organ of smell.

This is effected in all macroscopic animals by a lengthening of the epiglottis, which lies like a spatula above and behind the soft palate, bringing the nose and larynx into better 'line'. Hence the author contends that the primary function of the epiglottis is to subserve the sense of smell, and here it may be interpolated, by what other than this morphological approach could such a sound but far from obvious deduction as to the function of this organ have been made?

As the importance of smell gave way to that of sight and to what is of more immediate importance, viz., sound production and sound perception, the epiglottis has been either shortened or withdrawn from the nose. This has had some physiological disadvantages in that it has permitted mouth breathing, but there have been compensations in the great psychical advantages that have accrued from better phonation, increased resonance and the use of the organs of the mouth for articulation.

The author gives a lengthy discussion of the different types of deglutition that have had to be provided for and guarded against by the larynx, and he explains how much of the elaborate valvular development of the cords has been developed to control intrathoracic pressures in relationship to the pull of the pectoral muscles, a matter of no little importance for the survival of arboreal forms. Thus it comes about that the apes have even better developed vocal folds than we find in the human larynx.

Thus we get the enigma that Nature had perfected the larynx for other purposes, before Man put his mind to using it for his supreme and distinctive achievements of speech and song.

This, then, is the theme of this book, but it is not all morphology. The author does ample justice to straight anatomy, and resorts at times to radiology and to the experimental techniques of physiology. It is scientific laryngology at its best, and a landmark amongst modern medical publications.

PHYSIOLOGY OF VISION

Recent Advances in the Physiology of Vision. By Hamilton Hartridge, M.A., M.D., Sc.D., M.R.C.P., F.R.S. (Pp. 401 + xii. With 236 illustrations. 25s.) London: J. & A. Churchill Limited.

Contents: 1. Some Basic Properties of Vision. 2. The Perception of Shape and Size. 3. Investigations of Retinal Function. 4. The Perception of Colour. 5. Some Theories of Vision. 6. The Neurology of Vision. 7. Some Properties of the Structures of the Eye. 8. The Appreciation of Light and Colour.

Professor Hartridge, who is a world authority on ophthalmic physiology, has successfully undertaken this new edition on recent advances.

The subject matter has been divided into eight main chapters which are complete in themselves and which, besides giving the latest investigations, also give a brief outline of older works. Many of the chapters have suggestions along which future research can usefully be developed, and it is to be hoped that answers to the questions raised will soon be forthcoming.

In Chapter 1 there is a section on the X-ray methods of investigating the living human eye which Rushton and Crosby described in 1938 and which have since been further elaborated, notably by Goldman and Hagen. In Chapter 3 the author briefly describes the brilliant researches of Ragnar Granit, who stirred the imagination of physiologists by his micro-electrode technique for determining the colour perception of the retina. Also in this chapter is a survey of the work of Crawford and Stiles on the retinal direction effects of the human retina and their importance, not only to theoretical aspects, but to their apparently high differentiating power, particularly for hue. The remaining six chapters are all similarly interesting and informative, and one cannot but be amazed at the amount of research that has been done in the last few years.

Professor Hartridge is to be congratulated on the lucid presentation of the various theories and experiments, and his book is confidently recommended to those research workers and ophthalmologists who desire to keep abreast with recent advances in their speciality.

AMERICAN PRACTITIONER AND DIGEST OF TREATMENT

American Practitioner and Digest of Treatment. (80s. yearly for 12 numbers.) London: J. B. Lippincott Company. 1950.

Contents (Vol. 1, No. 1: Pp. 1-112): 1. The Recognition and Diagnosis of Diabetes Mellitus. 2. Recent Advances in Parenteral Therapy in Pediatrics. 3. Basic Principles in the Diagnosis and Treatment of Fractures. 4. Rupture of the Heart Muscle in Association with Coronary Arterial Disease. 5. Bed Pan Deaths. 6. Von Recklinghausen's Disease: Its Relationship to other Types of Neuro-ectodermal Dysplasia. 7. Physiologic Considerations in Thyroid Disturbances and Therapy. 8. Semiferous Tubule Failure Associated with Degenerative Change in the Hypothalamus (Case Report). 9. Diagnosis and Treatment of Functional Indigestion. 10. Priscoline as an Adjunct for the Relief of Vasospasm in Peripheral Vascular Disease. 11. The Use of Aureomycin Ointment in Dermatology. 12. A New Method for the Intermittent Injection of Antibiotics. 13. A Clinical Investigation of the Digitoxins. 14. Current Views concerning the Nature and Management of Leukemia and Allied Disorders. 15. Cases from the Medical Grand Rounds. 16. Book Reviews. 17. What's Your Diagnosis? 18. American Practitioner Forecast.

Contents (Vol. 1, No. 2: Pp. 113-224): 1. Vascular Diseases due to Hypersensitivity: So-called Diffuse Collagen Disease. 2. Acute Psychosis due to Atabrine. 3. Clinical and Pathologic Correlation of Carcinoma of the Breast. 4. Treatment of Manic Psychoses with Antihistamine Drugs. 5. The Pathologic Physiology of Peptic Ulcer. 6. Psychotherapy in General Practice—Mother and Child. 7. Pernicious Anemia of Pregnancy: Failure of Vitamin B₁₂ Therapy: Successful Treatment with Folic Acid. 8. The Amytal Interview. 9. Vitamin D and Tissue Calcification. 10. The General Practitioner Looks at the Feet. 11. Massive Intrapertoneal Haemorrhage from a Ruptured Coronary Vessel of a Uterine Leiomyoma (Case Report). 12. Investigation of Sterility in the Female. 13. Cases from the Medical Grand Rounds. 14. American Practitioner Forecast. 15. What's Your Diagnosis. 16. Book Reviews.

It is with great interest that we note the fusion of the *Digest of Treatment* with the *American Practitioner* as a new publication very elegantly and attractively produced.

The valuable features of both these well-established publications have been retained, and the result is an extremely practical periodical which should be of the utmost utility to medical practitioners, whether general or specialist.

The publishers claim that the new combined periodical 'may well become the leading journal interpreting the current clinical picture'. This seems a not unreasonable prediction.

This is a journal that can be recommended to our readers.

ARTICULAR AND SPINAL DISEASES

The Pathology of Articular and Spinal Diseases. By Douglas H. Collins, O.B.E., M.D. Liverp. (Pp. 331 + viii with 199 illustrations. 35s.) London: Edward Arnold and Company. 1949.

Contents: 1. General Anatomy and Embryology of the Joints. 2. Histology and Physiology of Bone, Cartilage, Synovial Tissues and Joint Fluid. 3. A Short Review of Bone Diseases. 4. Trauma in Relation to Joint Disease. 5. Osteoarthritis. 6. Gout. 7. Bacterial Arthritis—Specific Infections of the Joints. 8. Rheumatic Fever. 9. Rheumatoid Arthritis. (i) Pathological Description. 10. Rheumatoid Arthritis (ii) Aetiological Discussion. 11. Disorders of the Joints in Systemic Diseases Primarily Affecting Other Systems. 12. Tumours of Joints. 13. The Spine—Applied Anatomy—Malformations. 14. The Intervertebral Discs. 15. Spinal Diseases. (i) Scoliosis, Kyphosis, Trauma, Osteoporosis, Paget's Disease. 16. Spinal Diseases (ii) Tumours, Infections, Pott's Disease. 17. Spinal Diseases. (iii) Osteoarthritis, Osteophytosis, Ankylosing Spondylitis.

The scope of this book is rather wider than its title would indicate, considerably to the advantage of the book. Not only does the author deal with the pathology of all the better and less well-known forms of arthritis, but also he includes in Chapter 3 a very fine short review of bone diseases, which lends perspective to his consideration of joint diseases and emphasizes the functional unity of bone and joint.

The author approaches the subject through the normal anatomical structure of bones and joints, the physiology of bone formation, and the mechanics and mechanism of joint function. He emphasizes that disorders of bone must not be regarded just as disorders of calcium and phosphorus metabolism, but as disturbance in all the processes that go towards bone formation, including the formation of matrix.

The book is largely a record of factual observation, profusely illustrated with very fine pictures, gross and microscopic, of normal and abnormal bones and joints. In the chapter on osteo-arthritis, illustrations of the various grades

of osteo-arthritis of the knee, from the earliest to the latest stages, are outstanding. The illustrations of gouty joints are also outstanding. Another group selected for comment are the cases of arthritis associated with chronic neurological disease, such as Charcot's joints, and the arthritis associated with Pott's disease of the spine with chronic spinal cord compression.

The author deals with most forms of joint disorder, including, in addition to those already commented upon, rheumatoid arthritis, rheumatic fever, the specific bacterial arthritides and the spondylitides.

The book is a fine production on fine paper, and the illustrations are of a standard that cannot be improved upon.

The volume will be of great value and interest to pathologists and clinicians who wish to know the fundamental modern concepts of the pathology of the arthritides.

CORRESPONDENCE

INOCULATION AND POLIOMYELITIS

To the Editor: In reply to Dr. C. H. H. Coetzee's letter published in your issue of 3 June 1950, it may be of interest to him and to the other members of the profession to know the technique of sterilization before immunization employed by the Maternity and Child Welfare Branch of the Cape Town City Health Department.

On arrival at each clinic or school, irrespective of whether one or 100 children are to be immunized, all syringes and the necessary needles are boiled in a small sterilizer, heated by a methylated spirits burner. After an injection each needle is put back into the sterilizer and reboiled before being used again, and finally at the end of the morning's work syringes and needles are again boiled before being put away.

A survey was made recently of all poliomyelitis cases in children under 10 (viz. the age group which is being immunized), notified in the Municipal area during the last five years. In no case had a child contracted poliomyelitis within a few weeks of receiving immunizing injections against diphtheria.

E. M. Broome,
Maternal and Child Welfare Officer.

City Health Department,
12 Keerom Street,
Cape Town.
16 June 1950.

UNIVERSITY OF CAPE TOWN APPEAL

To the Editor: The University of Cape Town is launching a big appeal for funds for its development scheme, and I greatly appreciate this opportunity of bringing the appeal to the notice of the medical and dental professions in South Africa. It is a big appeal—more than a million pounds will be needed to complete the building programme alone.

The Medical School of the University of Cape Town is the oldest in South Africa and it makes bold to claim that ever since it turned out its first medical graduates in 1922 it has set and maintained a standard of medical training of which South Africa can be proud.

The Development Scheme will embrace more than the buildings to be erected at Rosebank. An important part of it will be devoted to the needs of the Medical School. Extensions of the Library and of the Pathology Museum and post-mortem rooms are already being built; but they are only a part of a comprehensive scheme for development that includes a refectory and common rooms for medical students, committee rooms and staff common rooms, offices and research rooms for the clinical departments and extensions to the physiology and pharmacology block.

Certain blocks at present under construction are planned ultimately for four storeys high. The additional storeys will soon be required if, as the University hopes, its clinical chairs are converted to full time and a new full-time chair in paediatrics and possibly one in orthopaedic surgery are created.

Our Medical School is not only improving itself in respect of undergraduate teaching, but is preparing also to undertake its full share in post-graduate medical training and in the training of the medical auxiliary services. For these reasons we feel that every doctor and dentist in South Africa has a direct interest in our welfare. From our own past students we hope for really generous assistance, concerning which they will be informed through our brochure and pamphlets; but even from those doctors who never attended the University of Cape Town we hope will come a stream of donations in encouragement of our common interest in the progress of medicine.

Thos. B. Davie, B.A., LL.D., M.D., F.R.C.P.,
Principal and Vice-Chancellor.

University of Cape Town,
Private Bag,
Rondebosch.
16 June 1950.

ONYALAI IN THE CAPE PROVINCE: HERPES ZOSTER

To the Editor: I have just seen my first case on onyala. I have never heard or seen any cases of this condition so far south and would appreciate information whether it has ever been discovered in the Cape Province before. All the references I can find, with one exception (B. T. Squires, *S. Af. Med. J.*, 25 September 1943, p. 292) give the geographical distribution as 'Rhodesia, East Africa and the Congo' (P. Manson-Bahr, *Synopsis of Tropical Medicine*, p. 140) or 'Transvaal, Rhodesia, etc.' (M. Gelfand, *The Sick African*).

The case history is as follows: S. Q., an African female aged about 36 years, had epistaxis of three days' duration in 1942, with haematuria, but no petechiae or bullae. In 1948 she again had epistaxis lasting three days. In September 1949 she had epistaxis with petechiae but no bullae, and again in October 1949 when I first saw her and thought she might be a vitamin K deficiency syndrome.

On 6 June 1950 she again had an epistaxis, this time with the appearance of petechiae and the typical haemorrhagic bullae on the tongue and on the lips. Her last menstrual period had ended on 4 June, but on 8 June she started a slight vaginal haemorrhage, which lasted a week.

She was put on intramuscular whole-blood (taken from her husband, Campolon 2 cc. daily, and Prokayvit one ampoule b.d.

HERPES ZOSTER

I recently saw a case of herpes zoster involving the anterior pillar of the fauces, the external auditory meatus and the skin of the neck.

History: J. S., an African male aged 39 years, was carrying a bale of hay on 13 June 1950 when he felt 'something bite' his neck. He saw nothing until 17 June when he noticed vesicles. He reported on 19 June to me with typical herpetic vesicles in two areas on the neck, in the external auditory meatus and on the anterior pillar of the fauces, all on the left side; also an enlarged tender lymph gland just below the left ear. So far there is no facial palsy, no taste-sense disturbance, no excessive flow of saliva; tinnitus is present but not severe, and hyperacusis is not detectable.

I report the case because of the association of geniculate herpes together with lesions in the distribution of C₂ (Coneybeare, J. J., *Textbook of Medicine*, states that 'lesions may be seen in the distribution of C₂ posterior post of scalp and below the jaw round towards the chin'.

P.O. Box 31,
Cala, C.P.
19 June 1950.

J. L. D. Paisley.

TEACHING OF ANAESTHESIA TO INTERNS

To the Editor: I read Dr. Barton's article, *The Teaching of Anaesthesia to Interns* in the 10 June 1950 issue of the *Journal* with interest.

I note that I am taken to task for saying 'that the extreme relaxation of the cardiac sphincter of the stomach obtained in a matter of seconds with *d*-Tubocurarine is a disadvantage in shocked emergencies'. Dr. Barton contends that the passing of a full size stomach tube will obviate this difficulty.

At this hospital, we have had regurgitation occurring around stomach tubes, where Curare was used before intubation. With Pentothal and Cyclopropane induction, or with Pentothal gas oxygen ether and myanesis there is less relaxation of the cardiac sphincter and more time to intubate and pack off.

I agree with Dr. Barton that, wherever possible, in emergencies and intestinal obstruction, a stomach tube should be passed before anaesthesia. This has been my practice over the last 16 years. However, on one occasion I passed a stomach tube on a patient with a perforated stomach, and found at operation that the end of the stomach tube protruded through the perforation. Since then I have been somewhat chary about passing a stomach tube when a perforated stomach has been diagnosed. In these cases I prefer a Ryle's tube or an Abbott's tube and suction.

Whilst congratulating Dr. Barton on his interesting article, I cannot agree with his conclusion that an endotracheal tube is not essential with Curare. Surely inflation in a prolonged apnoea, with a tightly closed mask and no endotracheal tube, causes inflation of the stomach, which not only interferes with the surgeon, but may cause acute post-operative discomfort.

Also cases in steep Trendelenburg, who are very relaxed, should be intubated and have the pharynx packed off to prevent regurgitation of gastric juices due once again to relaxation of the cardiac sphincter of the stomach.

Coronation Hospital,
Coronationville,
Johannesburg.
19 June 1950.

Mollie B. Barlow.

GENERAL PRACTICE IN EAST GRIQUALAND

To the Editor: This question of general practice in East Griqualand—coming fresh to it from a chromium plated clinic in Europe:

There is no efficient nursing sister to act as intermediary between me and impatient Europeans; no means of grasping the Native language at my age, intuitively: there I must sit, waiting patiently, while my interpreter worms the patient's complaints out of him, and then contain my soul in patience a while longer while he in his turn enjoys his flowery translation.

Many are the lessons I have learned: the matter of prognosis for instance. I used to stand at the end of a hospital bed and think to myself 'You don't know when you will be dying, but I do'. I felt that accurate prognosis was a corollary to accurate diagnosis. But with a sick Native I cannot prognose. Take the case of Makandle: Here was a very sick thin man of 50 brought a long distance by his young wife, solicitous, good-looking, well-dressed in the old-fashioned missionary style. The symptoms were those of carcinoma of the oesophagus. Still, aneurysm of the aorta had to be excluded; there was no inequality of the pulse; no pulsating thoracic tumour; no spine tenderness; no tracheal tug—this most elusive and yet important of signs and which the older clinicians tell us should be elicited in a definite way: stand above your patient's head, put both index fingers on the trachea, exert pressure upwards and if a tracheal tug is present you will feel the unmistakable pull on the fingers.

The only special investigation I could do on the spot was a sedimentation rate. It was excessively high. Yes, I did send away his blood for a Wassermann test—a day's journey to Durban—and as it was excessively hot it was, as is not invariable, haemolysed.

But Makandle would not accept his poor prognosis. He would stay on a neighbouring farm—the foreman was a distant relation—while he gave the treatment a chance. One fine day the foreman, named 'Kantoor', was at my rooms. They felt Makandle was dying and knew that the 'Moerena' would be very angry if one of his employee's guests died on his farm. Would I please come out and persuade Makandle to return home? When I arrived early in the morning, there was a general indaba in the big foreman's hut and the wasted Makandle as the central figure. His bearing was most serene. He understood not a word I said and answered with the only English he knew: 'It is good. It is good.'

I despatched him with a mixture of Tinct. Opii and Ext. Glyz. Liq. to counteract the constipating effect and a supply of phenobarb. gr. 1.

Some three months later the same aloof young woman in her wide printed skirt was squatting on my consulting room floor. Tied in a blanket on her back were a cock and a protesting young chicken. In Afrikaans we call it 'abbah', in Xosa they call it 'pepe' when it applies to a child carried on the back. What the term is for chickens on the back, I don't know: Makandle sent greetings and wanted more medicines. The cock was for the 'bottle' and the chicken for the 'pillies'. I was speechless and humble.

Since then there has been silence. Some day when she is expecting her first baby by her second husband she will come again to have her 'machinery examined'. Then I shall learn the full story of how and when Makandle died.

Even in Europeans I have had a few shocks with prognosis. They are tough, these East Griqualanders, and follow no definite medical rules. The more alcohol they have imbibed in days past, the longer they seem to last, provided they reach the age of 60.

In the beginning I made the mistake of giving the prognosis in days, and then for two or three weeks afterwards had to pass the line of relatives gathered in groups, in what seemed an interminable line to me, from the front gate to the bedside.

But stalwart of the stalwarts was my last case of carcinoma. He and his brother pioneered in this part of the country when there was as yet no railway; in fact he has no memories of his arrival as he was tossing in the delirium of typhoid, in the back of a 'scotch-cart'.

Now he has a papilloma of the bladder with secondaries obstructing the lymphatics to his left leg. The important differential diagnostic point was whether the obstruction was due to X-ray sclerosis, the end result of treatment received earlier on, or growth. The determining factor was the presence of three soft lumps in the subcutaneous tissues of his anterior abdominal wall. So soft were they that they were missed on inspection.

How extremely important this examination of the surface of the body is and how often neglected! Inspection and palpation of the whole body and thumping of all superficial bones with palpation of the deeper bones, for any case suspected of carcinoma.

The nature of the secondary is that of the primary: soft or hard, coloured or not.

Experience is a matter of seeing enough things and remembering one's mistakes. Well do I remember the man of 55 who was admitted late one evening to a London hospital, during the war. He had a right-sided hemiplegia; yes, he was minus one eye, but what with the atrocious black-out lighting, his inarticulateness as the result of his 'area of speech' involvement, and my anxiety to be elsewhere, I dubbed him 'cerebral thrombosis', gave a few brief instructions to the nurse and disappeared.

Unfortunately to my mortification the next morning, my chief was not in such a hurry. He lifted each arm carefully, and there along the course of the lymphatics were the small dark-blue split-pea nodules shining through. The same nodules were found on the scalp, the same had caused his hemiplegia. But his eye had been removed 12 years before! No matter, it was still a malignant melanoma with secondaries.

A few moments ago I took from my bookshelf that meandering but interesting tome *The Spread of Tumours in the Human Body*, which informed me that the longest interval recorded between a primary malignant melanoma and its secondaries was 32 years!

Particularly important for physicians as well as surgeons to decide nowadays is whether a bronchial carcinoma is operable or not. Again a case comes to my mind, instructive, as often as I remember him: A man in early middle-age with carcinoma of the bronchus but a short history; a good general condition and a minimal X-ray shadow. I was very anxious to have a lobectomy performed on him. The one black spot was a single enlarged axillary gland on the same side. 'Why', I said to Fatti, now at Baragwaneth, 'Even the man's sedimentation rate is normal.' His reply was: 'You cannot diagnose malignancy with a test tube. First have that gland sectioned and then we will decide.' Needless to say, or I would not remember this story so well and so humbly, it was malignant.

Odie.

Cedarville.
20 June 1950.

X-RAY TREATMENT IN DERMATOLOGY

To the Editor: Dr. Weinbren's incursion into the pleasant exchange of views between Dr. Charlton and Dr. Leeming goes well beyond the scope of the original argument.

I am not joining issue with Dr. Charlton, although I must admit I was surprised to find that a total of 2,400 r was given for 'epidermophytosis of the hands and feet', a condition which one should be able to clear up in a week or so with any of half a dozen fungicides. I was even more surprised to find in this year of calciferol and streptomycin that a radiologist was still advising X-ray therapy for lupus vulgaris.

That is neither here nor there. What I object to in Dr. Weinbren's letter is that, as a dermatologist, in common with other dermatologists, I have just had an accusation of mal-praxis levelled against me. Dr. Weinbren's statement that 'all a dermatologist needs is an X-ray machine, and a demonstration by a salesman, lasting 15-20 minutes' is just that.

Dr. Weinbren makes quite a point of the inexpensiveness of a skin therapy unit. This inexpensive machine costs £1,500. That may not be much to a radiologist, but it is a lot of money to a dermatologist.

The Medical Council, says Dr. Weinbren, does not require a dermatologist to have a knowledge of X-ray therapy. Quite true! But the Medical Council does require post-graduate training and a post-graduate qualification for registration as a dermatologist, and I cannot see any reputable institution issuing such a qualification or certifying any such training without being satisfied that the candidate is competent to carry out such X-ray therapy, as is done in any skin clinic and any private dermatological practice anywhere in the world.

Dr. Weinbren does not like to see dermatologists doing their own X-ray therapy any more, I suppose, than dermatologists like to see radiologists giving X-ray therapy to skin cases that have not been seen and diagnosed by a dermatologist. One would perhaps be inclined to agree with him if he pursued the argument to its logical conclusion and required a dermatologist to call in a surgeon every time he wanted to do a biopsy, or a pathologist when he wanted to examine a scraping for fungi. Presumably we would still be allowed to prescribe an ointment.

The fact that two American dermatologists—McKee and Cipollaro—wrote a textbook on X-ray therapy in skin diseases suggests that X-ray therapy is an integral part of a dermatologist's technique. Surely McKee and Cipollaro did not write their book for radiologists. That would have been presumptuous, indeed.

Lastly, Dr. Weinbren's strictures on the treatment of neoplasms by dermatologists seem quite unreasonable. He would allow us, if properly trained, to treat severe acne with X-rays. He would allow us to do epilations for ringworm. After all, Sabouraud was only a dermatologist. But Heaven forbid that we should treat a rodent ulcer. He draws the line there, and, like the equator, the line is imaginary.

S. Gordon.

504, Medical Centre,
Jeppe Street,
Johannesburg.
23 June 1950.

NOT SO FUTILE RADIOLOGICAL PROCEDURES

To the Editor: Dr. Victor Berman is too absolute in his condemnation of the screening of the paranasal sinuses. When the eyes are well adapted, as they should be, when screening a chest, the antra are clearly translucent in their normal state. The frontal sinuses and anterior ethmoids are less well seen and the posterior ethmoids and sphenoids are relatively poorly visualized on fluoroscopy.

As the antra are common sites of sinus pathology, screening that is confined to the antra alone may give very useful information, with the minimum trouble to the patient and at the cost of about 15 seconds of extra work for the radiologist.

One may reasonably divide the fluoroscopic observations into three groups:—

- The first where the antrum is clearly translucent.
- The second where it is veiled but not opaque.
- The third where it is opaque.

In the first group, it is true, one may be missing some 'subtle' X-ray changes, but I do not think one is misleading the clinician by the statement that 'the antra were clear on screening', as long as the clinician realises that *minimal pathology may be missed on screening*. In the second group the veiling may be due to the slope of the antral walls and not necessarily due to pathology.

I find that in an analysis of 149 chest cases screened recently, 23 cases of antral infection were detected, which had not been suspected clinically and which were verified by radiography. Six cases that were veiled proved to be normal on radiography, the veiling being due to the slope of the antral walls; 120 cases were clear.

These figures show that the little extra time taken in dark-adapting one's eyes properly and the seconds spent on looking at the sinuses, are not wasted.

The reason why it is not done in Hospital practice is due to the pressure of work in the X-ray department and the fact that every chest is not screened routinely, as in private practice.

C. J. B. Muller.

202, Dumbarton House,
Cape Town.
23 June 1950.

THE MEDICAL COUNCIL AND THE RIGHT OF APPEAL

To the Editor: I would like to congratulate you on the courageous editorial published in the last number of the *Medical Journal*.

If it is true that there is no further Court of Appeal following a decision by the Medical Council, it should be part of the function of this *Journal* to make clear two things: Firstly, the full personnel of the Medical Council is not generally known; the names and credentials of each member should be familiar to us so that we may be assured of their competency. Secondly, all discussions and adverse decisions should be made public, and the manner in which the members have discussed the case should be indicated. For example, in a matter relating to the practice of medicine it would interest us to know whether the opinions of practising doctors, if any, line up with those of the academic professors, dentists and laymen who constitute a large section of the Council.

In my opinion, it is essential that the views of the individual members of the Council should be brought out into the open in order to minimize the danger of victimization.

Medico.

Johannesburg.
27 June 1950.

[The following are the members of the South African Medical and Dental Council:—

1. Appointed by the Minister of Health

- (a) *Medical Practitioners:* Drs. K. Bremer, P. J. G. de Vos, G. W. Gale, S. F. Oosthuizen, B. Vivier.
- (b) *Dentists:* Dr. R. V. Bird.
- (c) *Lay Members:* E. W. Douglass and W. H. Rood.

2. Elected Members

- (a) *By Medical Practitioners:* Drs. J. Black, A. Bloom, L. I. B. Braun, E. H. Cluver, R. L. Impey, J. N. W. Loubser, A. Radford, T. L. L. Sandes, M. Shapiro, P. F. H. Wagner.
- (b) *By Dentists:* Drs. J. H. Breyer, C. McG. Cunningham, J. W. E. Graham, J. A. Stegmann.
- (c) *By Nurses, Midwives and Masseurs:* Gwendoline Buttery, Constance A. Northard.

3. Appointed by Universities

- (a) *University of Cape Town:* B. J. Ryre.
- (b) *University of the Witwatersrand:* G. A. Elliott, J. C. M. Shaw.
- (c) *University of Pretoria:* L. J. te Groen, H. H. Louw.

—Editor.]